

CONTRACTORS and ENGINEERS

A Bittenheim Publication

MAGAZINE OF MODERN CONSTRUCTION

NOVEMBER 1961



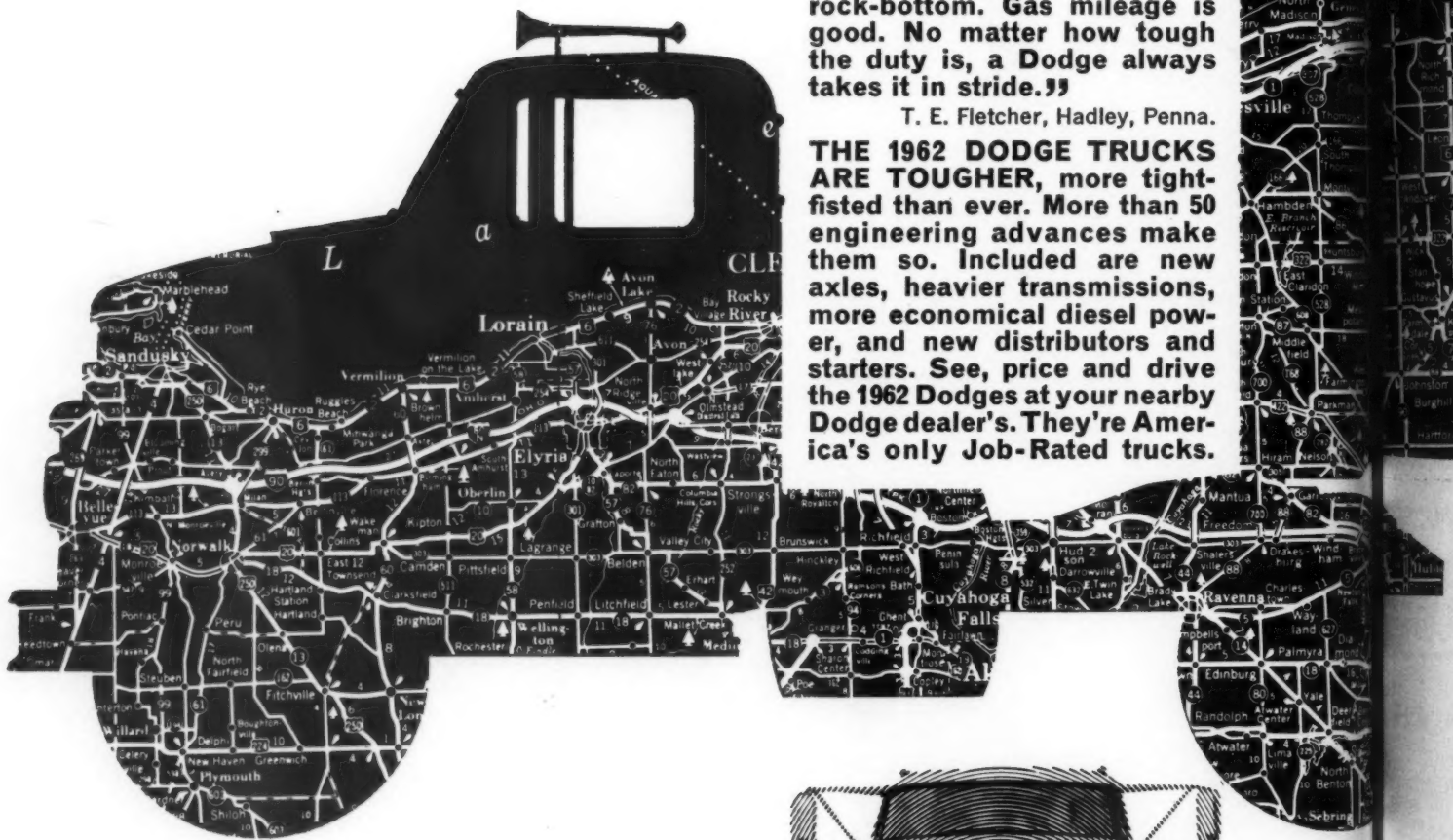
Flaming Gorge Dam rises 40 feet a month

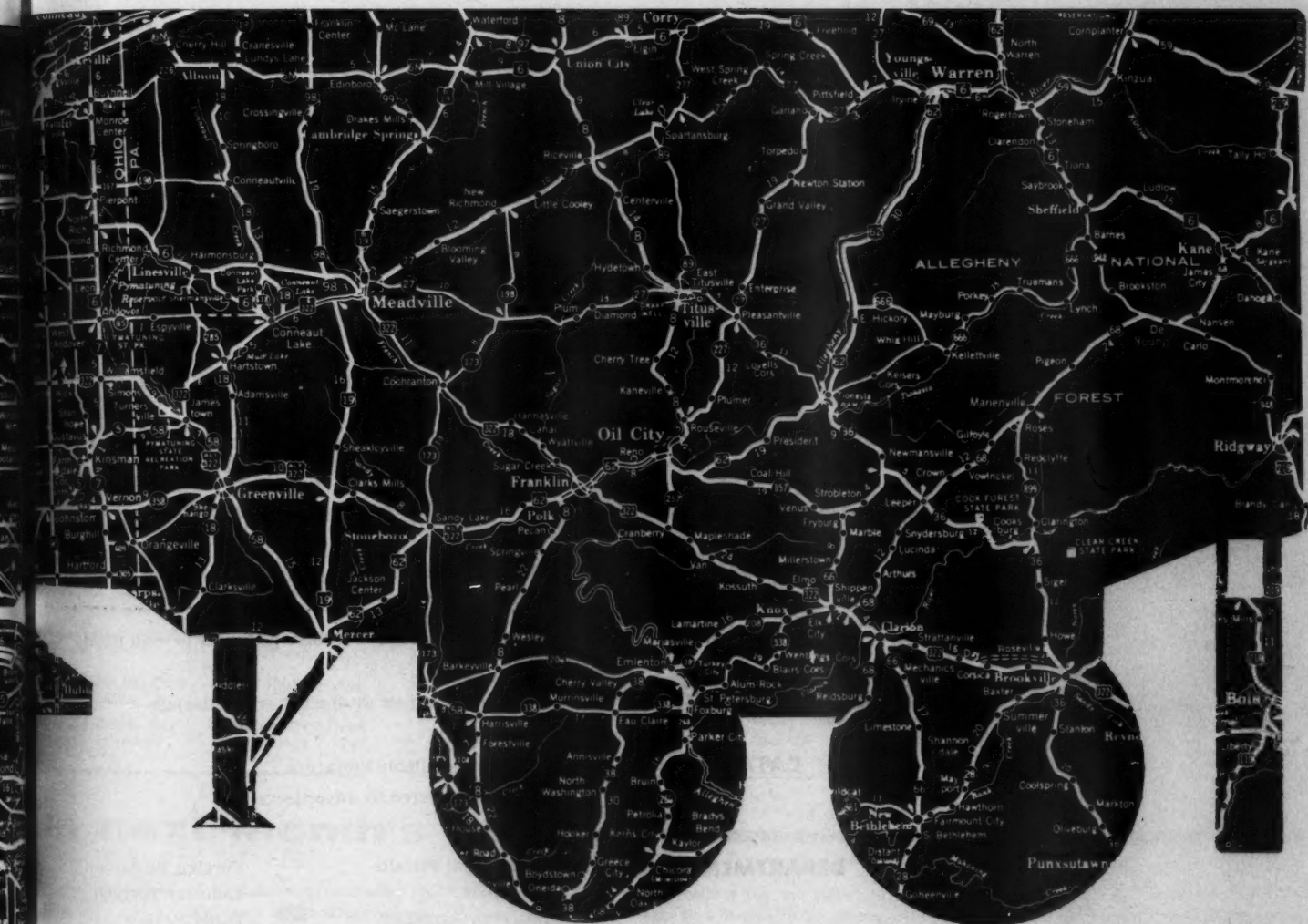
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CONTRACTORS and ENGINEERS

MAGAZINE OF MODERN CONSTRUCTION

NOVEMBER, 1961

A Battenheim Publication

Prestressed steel arches

- 22 Alternate compressed and tensioned members support the roof of a supermarket in Poland. The suspended roof has two sections, using a system that is composed of convex steel arches with prestressed concave bracings.

Post-tensioned retaining wall

- 28 In a narrow 43-foot work strip, a Detroit contractor ties back a retaining wall, building it in two lifts so that post-tensioned concrete caissons can be installed.

New methods cut costs of dome

- 36 How to build a 244-foot concrete roof for only \$3.16 a square foot? Cast the dome on a mound of gravel overlaid with foam plastic; then raise it 16 feet onto steel columns by the standard Lift-Slab method.

Form stays intact to mold houses

- 58 Outside walls plus interior partitions and closets are cast in one operation with this forming setup; then the 18-ton assembly is lifted intact and moved to the next foundation for the casting of a new house.

BUILDING 34 Piling takes tough driving around building site

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Low-cost concrete dome Page 36



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Casting a complete house Page 58

COVER



While a Manitowoc 4500 crane handles forms and reinforcing at the powerhouse area, a Blaw-Knox 8-yard bucket rides one of the two Washington Iron Works cableways to place concrete for a block of the thin-arch dam at Flaming Gorge in Utah. B-K forms are being used for the 7½-foot lifts. Traveling tail towers of the cableways ride along the top of the bank at right.

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CONTRACTORS AND ENGINEERS

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In next month's Issue

Ice—and plenty of it—helped a contractor to halve the time it would have taken under normal conditions to construct four sheet-pile cofferdams for bridge piers in a lake near Sanford, Mich. The cofferdams were driven through the frozen waters of the lake, making the operation resemble a dry-land job for the crews and for the field engineers of the state highway department. Only a crane, which was too heavy to be supported on the 18 to 22-inch-thick ice, had to work from a pontoon barge. All the advantages of handling the work in this way—and the disadvantages—are covered in this report from the field.

Ever hear of a building contractor who completes 21 stories a week? There is one; and he's not doing the impossible. The job is a new apartment hous-

ing project in Chicago, calling for a number of structures that will rise to a height of 16 stories. Re-use of forming and familiarity of the crews with their jobs through repetition are helping to keep the project moving along at a fast clip. To hit production that averages out to about three complete floors a day, some 2,000 men are on the job, along with 23 cranes. The whole story is told in an on-the-site report from field editor Bill Allen.

A shop-built rig that strips deck forms from bridges is cutting into work time for a contractor on a pair of prestressed girder spans on the Houston expressway system in Texas. The rig, handled by one operator while another man wrecks out the forms, can raise and lower its platform and swing it

through a 270-degree arc. It moves under its own power. In addition, the unit serves as a work platform for men working on the outside face of the span.

The featured engineering story deals with one of the most unusual plans we've come across in some time for the construction of a dam. The proposed structure, located near Fairbanks, Alaska, will have an impervious core of gravel that will be frozen into a solid mass. A system of heat-exchanging units will be used to freeze the material, and heat will be extracted from the core and given up to the cold air outside. The story of this engineering project, with drawings of the proposed work, gives an over-all picture of a truly unique piece of construction.

Basic Values and Relative Weights of the 1957-59 Base Highway Construction Bid Price Index

Item	Unit	Base quantity	Base unit price	Base dollar amount	Relative weight
Excavation.....	cu. yd.....	Thousands 3,641,885	\$0.42	Thousands \$1,529,592	Percent 25.8
Surfacing:					
Portland cement concrete.....	sq. yd.....	154,953	4.38	678,221	15.0
Bituminous concrete.....	ton.....	111,516	6.66	742,472	16.4
Subtotal, surfacing.....				1,420,693	31.4
Structures:					
Reinforcing steel.....	lb.....	2,206,579	.129	285,139	6.3
Structural steel.....	lb.....	2,581,462	.195	502,294	11.1
Structural concrete.....	cu. yd.....	14,533	54.18	790,027	17.4
Subtotal, structures.....				1,577,460	34.8
Total.....				4,537,745	100.0

Source: U. S. Bureau of Public Roads

Business Comment

Price index revised

The Bureau of Public Roads is modernizing its highway construction bid price index by updating the base period to 1957-59. The old index, based on 1925-29 conditions, has become outdated because of radical changes in the nature of highway construction that have taken place since then.

Quantities per mile are obviously far different today from what they were in the twenties. This, by itself, would not affect the index if the base quantities remained in the same relations to each other, but, actually, the relative weights of grading, surfacing, and structures have changed greatly.

The geometric standards of modern highway construction require proportionally more earthwork and structures. So, while the quantity of surfacing put in place during the 1957-59 base period was much greater than during the 1925-29 period, percentage-wise, surfacing decreased considerably as a cost component in relation to grading and structures.

Another basic change in the industry reflected in the new index is the geographic distribution of work. This has an appreciable effect since quantities and bid prices vary considerably across the country. In addition, the new index for the first time will take bituminous paving into account in the computation of the paving component. The old index assumed that prices for portland-cement concrete pavement alone would accurately reflect price movements for all types of pavements. While this was probably valid at the time, and there is still some similarity in the price trends of portland-cement concrete and bituminous concrete, a difference of several per cent in the index results when the actual average prices for each type are derived separately.

Except for the inclusion of the bituminous factor, the method of computation for the new index is very much like that of the old one. One basic difference is that the new index will use nation-wide total quantities to compute base-period figures, while the old one used per-mile quantities.

The table above shows the 1957-59 base quantities, total dollar amounts, and relative weights of the index items. To develop the 1957-59 based index for any given period, BEP economists compute the index for each item by dividing the base-period unit price into the U. S. average unit price for the particular period and multiplying the quotient by 100.

Values of Price Index Indicator Items With Use of 1925-29 and 1957-59 Base Data

Item	1925-29 quantities as 1925-29 prices	1925-29 quantities as 1957-59 prices
Excavation.....	Percent 36	Percent 24
Surfacing:		
Portland cement concrete.....	48	54
Bituminous concrete.....	0	9
Subtotal, surfacing.....	48	63
Structures:		
Reinforcing steel.....	5	7
Structural steel.....	2	12
Structural concrete.....	9	12
Subtotal, structures.....	16	31
Total.....	100	100

CONTRACTORS AND ENGINEERS



White concrete traffic marker on Northampton County Road, Palmer Township, Pa. General Contractor: J. H. Beers, Inc., Bangor, Pa. Marker Contractor: Polselli & Angelucci, Philadelphia, Pa.

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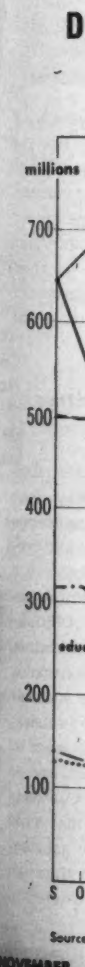
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Prestressing with steel

In recent years when the word "prestressing" was mentioned, the thought association usually turned to prestressed concrete. The use of this material of construction has had a rapid growth in this country since World War II, due in part to a scarcity of structural steel and post-war control of its employment by the National Production Authority.

But according to Theodore Higgins, Director of Engineering and Research at the American Institute of Steel Construction, the idea of prestressing was applied to steel long before the availability of today's high-strength steels made prestressed concrete possible. Speaking before the second annual Industrial Building Exposition and Congress, Higgins reminded the assembled engineers, architects, building contractors, and corporate executives that the installation of a wrought-iron truss rod beneath a bridge beam—in common use around the turn of the century—was prestressing in the truest sense of the word, even though the term "prestress" had not yet come into engineering parlance.

This early prestressing was usually done with wrought iron or mild steel, the only materials then available for making truss rods. The use of such rods increased the load-bearing capacity for the limited number of beam sizes then available. However, as structural-steel technology advanced, deeper and heavier

beams were rolled, obviating the need for truss rods.

This month C&E carries an article describing the use of prestressed continuous steel arches in the construction of a supermarket in Warsaw. Polish designers employed lightweight members in the arch-and-tie framework to support wide-span roof areas. While tonnage was undoubtedly light, the fabrication and erection of the intricate network necessarily indicated a high volume of labor man-hours. In a country where steel is relatively scarce and the wage scale is relatively low, such construction is feasible. But where steel is readily available and erection costs are high, a simplified design is in order.

As engineer Higgins pointed out: "Prestressed steel usually consists of high-tensile steel tensioned against an ordinary carbon-steel beam, girder, or truss to develop a stronger and more efficient structure. Since steel requires less bracing in tension than in compression, a few highly tensioned bars or cables can be made to take much of the weight, and thus double load capacity and improve rigidity. . . . The cost of steel has increased. . . . Any method that enables us to get more work out of the same or less steel deserves our consideration."

Higgins credited the late Prof. Gustave Magnel of Belgium as being the pioneer in the

use of prestressed steel. Prof. Magnel has been even better known for his developments in prestressed concrete. Higgins cited examples of Magnel's work, especially with prestressed steel trusses.

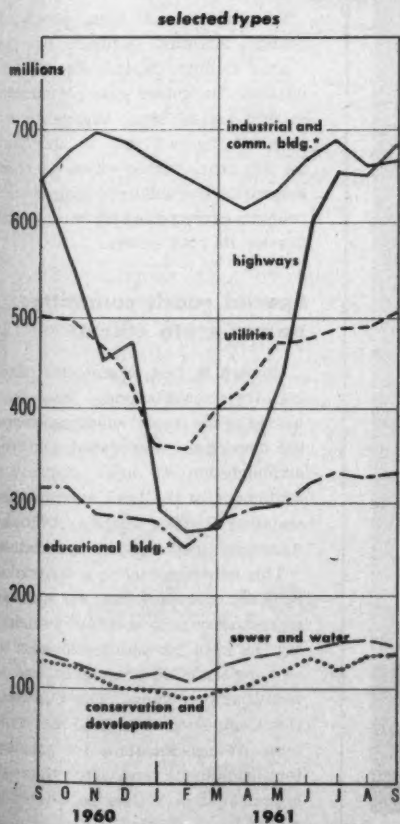
The AISC director of engineering admitted that the United States lagged behind Belgium and Britain in the use of prestressed steel, but that in the past few years U. S. designers are recognizing the economies that may be achieved with it. Among such examples, Higgins mentioned the 140-foot cantilever trusses for the United Air Lines hangar at Chicago's O'Hare International Airport; the cantilevered girders for the Pan American passenger terminal at Idlewild Airport in New York; and the N. Y. Port Authority bus terminal where the lower chords are prestressed in 200-foot Warren trusses.

Thus the new application of a long accepted building material is finding use in such large-span open buildings as hangars, terminals, garages, factories, assembly halls, sports arenas, etc. As for beauty in design, T. R. Higgins noted that prestressing may be incorporated in the design to effect esthetic ends as well as economic means. Today's engineer or architect might do well to keep aware of how to make steel work harder and harder per pound of weight and per dollar of fabricating cost.

Industry Trends

DOLLAR VALUE OF NEW CONSTRUCTION

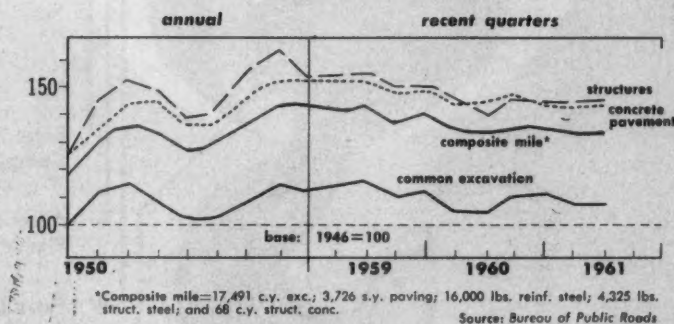
Recent Monthly Trends
(current dollars)



Source: Bureau of the Census *public and private

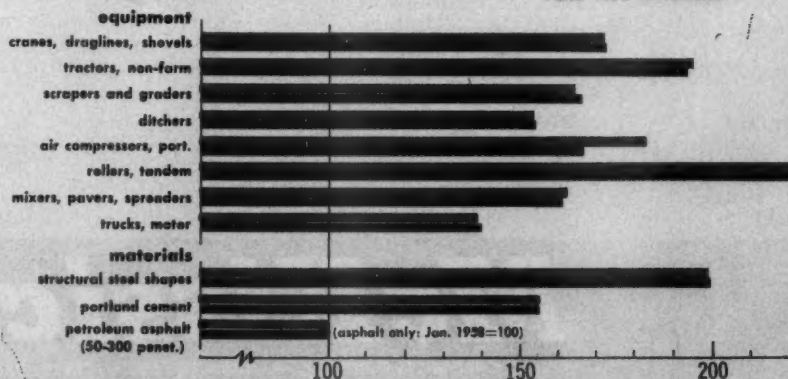
AVERAGE BID PRICES

Federal Aid Highway Construction



PRICE INDEX 1947-1949 = 100

AUGUST 1961
YEAR AGO



Source: Bureau of Labor Statistics' Wholesale Prices and Indexes

Names in the News

BPR names five regional road evaluation officers

Five men with long investigative experience have been named by the Bureau of Public Roads to study any irregularities that may appear in the federal-aid highway program.

Called regional program evaluation officers, they are Joseph M. O'Connor, George F. McInturff, William C. Thornton, and Frank A. Stanton—all former agents of the Federal Bureau of Investigation, and Virgil M. Redwine, formerly with the office of investigations, U. S. General Accounting Office.

Fred J. Driscoll, Jr., director and vice president of the George F. Driscoll Co.



Driscoll names officer

Fred J. Driscoll, Jr., has been elected director and vice president of the George F. Driscoll Co., one of New York's oldest construction firms. In his new position he will have direct

charge of all construction activity. He was formerly superintendent of construction and project manager.

Vermont engineers present scholarship

The Vermont Society of Engineers has presented its fourth \$300 scholarship to an outstanding high school graduate who is a candidate for an engineering degree. This year's winner is Robert B. Lee of Canaan, who will attend the University of Vermont.

Highway commission news

Roger R. Jackson, Jr., has been appointed public relations officer for the North Carolina State Highway Commission.

Corps assignments

Col. Arthur H. Frye, Jr., has been assigned as division engineer of the South Pacific Division, U. S. Army Corps of Engineers. He will be in charge of the Army's \$170 million military and civil-works construction program in California, Arizona, Nevada, Utah, and five bordering states.

Three Army engineers have been promoted to the rank of temporary major general: Brig. Gen. Alden M. Sibley, assigned to Washington as deputy chief of engineers for military operations; Brig. Gen. Alvin C. Welles, now deputy for site activation, ballistic systems division, Air Force Systems Command, Los Angeles; and Brig. Gen. James B. Lampert, director of military construction in the office of the chief of engineers, Washington, D. C.

Col. John D. Cole has received the rank of temporary brigadier general and has been assigned to the Eighth U. S. Army in Korea.

Vermont highway dept. promotes R. H. Arnold

The Vermont Department of Highways has appointed Reginald H. Arnold to be assistant chief engineer, with offices in Montpelier. He had been district highway engineer at Bradford since 1946, and has been with the department since 1934.

PCA appointment

David H. Comann has been appointed district engineer of the Portland Cement Association's Iowa District, with headquarters in Des Moines. He succeeds the late Fred P. Loy.

Lifstiz takes post as county highway engineer

Sol Lifstiz has been appointed county highway engineer by the Wayne County (Mich.) Road Commission. He joined the commission in 1926, and although eligible for retirement, he will stay in this post for five years during which his chief responsibilities will be to complete the county's expressway and improve and develop its road system.

Special roads committee names state official

Howard S. Ives, Connecticut state highway commissioner, has been named to the special subcommittee on the development, appraisal, and recommendation of new construction equipment, of the Joint American Association of State Highway Officials-American Road Builders' Association.

This subcommittee is a continuing body set up as a vehicle for highway representatives to spell out to industry the need for the development of new construction equipment, and to test that equipment. The Construction Committee of AASHO may write tentative specifications for satisfactory equipment, and after thorough appraisal it may then be covered in AASHO publications.

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CONTRACTORS AND ENGINEERS

NOVEMBER, 1

inside Story

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Surveying Washington...

by E. E. Halmos, Jr.

With Congress finally out of town, attention in Washington shifts to the Supreme Court, which opened its fall term with a record number of cases on its docket, many of them directly concerned with construction labor problems.

Of special interest to contractors is a group of cases involving injunctions and damages in strikes. Decisions will be vital to the industry. One case will determine whether an employer can get a federal court injunction against strikes in violation of no-strike clauses in labor agreements; another concerns award of damages against union leaders for inducing strikes in violation of no-strike agreements; still another is over union demands for a performance bond to insure employer adherence to agreements.

Other questions before the high court are these: whether employee seniority is transferable; whether the National Labor Relations Board can hold the international union responsible for secondary boycott violations by locals; whether state courts can handle certain damage suits against unions for breach of agreements and can issue injunctions against picketing when the picketers do not represent any employees; whether the wage-hour law applies to construction of buildings to house military personnel and radio equipment in national defense programs; and whether the wage-hour law applies to construction of a dam for recreational purposes.

On legalisms and labor, don't overlook a recent string of decisions by the NLRB. One of these held that if "agency shop" agreements (where employees must pay union dues but needn't join the union) are okayed by courts in states

that have right-to-work laws, they are legal under Taft-Hartley.

In a case involving the teamsters, NLRB flatly refused to permit any "hot cargo" clauses in contracts on grounds that Congress wanted to free employers from threats of refusal to handle goods. Inclusion of any "hot cargo" clause is a violation of law, the agency said, whether or not the clause was ever invoked.

Another NLRB decision threw out a complaint against Precrete, Inc., a New York firm that claimed it was forced to close down because of union demands for high wages. According to testimony, the company shut down when lathers demanded \$4.17 an hour plus 27 cents in fringe benefits. A few days after the shutdown, the firm reopened to complete a previous order, using hod carriers instead of lathers. The lathers promptly picketed the plant. NLRB said the company "acted in good faith" and couldn't be expected to reopen "on such an unsound economic basis."

The first session of the 87th Congress set up a \$7 billion program for construction. Biggest share of that money is the \$3.8 billion omnibus public-works appropriation passed just as Congress quit. This includes about \$1 billion for Army civil works, \$280 million for the Bureau of Reclamation, \$195 million for the Atomic Energy Commission, \$150 million for a 2-year airport-aid program, and \$213 million for public-building and military construction.

Over all, the Congressional session contained few surprises for the construction industry and very few significant legislative actions. Congress batted down what it considered inroads on its powers by the Executive, and most attempts at "back door" spending.

In the infighting over public works, public-power advocates were beaten on one item (the proposed \$95 million generator at Hanford, Wash.), but won a partial victory on another (construction of power lines by the Bureau of Reclamation for its Upper Colorado Project).

Left hanging fire for next session were several dozen matters of interest to construction, including tax relief for the self-employed, changes in anti-trust laws to include labor unions, estab-



lishment of federal departments of Urban Affairs and Transportation, and regulation of bridge heights over rivers.

Before it went home, Congress did end an anomaly in the Bureau of Public Roads by eliminating the title of "Commissioner" and substituting for it "Deputy Administrator."

Strict and swift action against "wrongdoing" in the highway program will be forthcoming from the Bureau of Public Roads. Contractors and officials should make no mistake on this point. Federal Highway Administrator Rex Whitton says, "What Congress has authorized, Congress can take away. We hope...it will not be necessary to cut off federal aid in any more instances—but we will not hesitate to do so if such action is indicated..."

Contractors can profit by studying a new manual that sets up a uniform system of signs, markings, and barricades for the protection of construction work. Worked out by the District of Columbia Department of Highways and Traffic, the manual is now being incorporated into city contracts. It prescribes size, shape, color, and illumination of signs, including hand-carried flags and other signals used by flagmen and watchmen. Free copies can be obtained from the Department of Highways and Traffic, District Bldg., Washington 25, D.C.



Tricks of the Trade

Foam-plastic block-outs simplify column forming

Consolidated Construction Co., Des Plaines, Ill., has found that foam-plastic block-outs simplify the forming of double columns when expansion joints are called for in concrete buildings.

In its work on the two terminal buildings at O'Hare Field in Chicago, the firm used 2 x 3-inch strips of Styrofoam to fill the gap between the double columns. The Styrofoam formed only the outer edges of the gap; the inside was formed by a rubberlike material that remained in place.

In work on the first of two columns, the foam plastic was included in the form (see photo). The two strips of



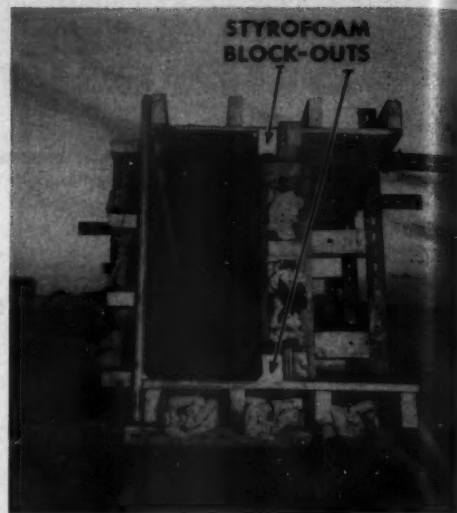
plastic were backed by wood members. Each strip of plastic abutted to a rubber waterstop. A plywood panel formed the portion of the column between the two waterstops.

After concrete for the first column was placed, the side abutting the expansion joint was stripped. The other three sides of the form were left in place. The exposed Styrofoam adhered to the side of the first column.

A 2-inch-thick layer of rubberlike material was then stuck to the side of the column between the strips of plastic. Concrete was placed up against this as it was placed against the plastic. The outer plywood form was wrapped around both of the columns.

After concrete for the second column was placed, and the forms stripped, the Styrofoam was ripped

out of the joint. A channel-type insert was then set in the joint. The insert held polished metal plates that concealed the gap but permitted expansion.



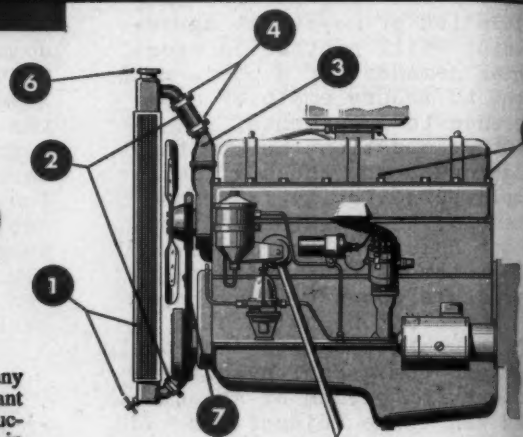
Antifreeze: what's the best type to use; how to make sure you get maximum protection

It's getting pretty close to antifreeze weather in many parts of the country, which brings up two important points: choosing the best type of antifreeze for construction machinery; and making sure the cooling system is in good condition, so the antifreeze can do its job properly.

The right type of antifreeze is the permanent kind. Construction equipment engines operate best at 180°F jacket temperature which is ten degrees higher than the boil-off point for alcohol. Permanent antifreeze (like Texaco Startex) will stay on the job at the temperature that's best for the engine. *Don't* substitute salt or kerosene solutions. They won't freeze, true enough, but they're tough on engine components.

It's important to keep the cooling system in good shape for three reasons: first, because antifreeze that gets into the crankcase causes severe varnish deposits on pistons and rings; second, because you want the antifreeze solution to circulate properly; and third, because antifreeze lost through a leak costs a lot more to replace than just plain water. Before you add antifreeze, check the following points:

- 1 Clean the cooling system—drain and flush thoroughly.
- 2 Check the radiator hoses, replace any that are soggy or collapsed.



- 3 Check the thermostat. If the thermostat is in good condition, the thermostat discharge connection will remain closed until the coolant in the water jacket reaches operating temperature.
- 4 Tighten connections on hoses that don't need replacing. Antifreeze can pass through spaces too small to cause water leaks.
- 5 Tighten cylinder head, oil cooler and other hold-down bolts.
- 6 Check radiator filler cap gasket.
- 7 Inspect and adjust fan belt.

Now you're ready to put in the antifreeze.

After the antifreeze is in, it's a good idea to:

- 1 Check the level at operating temperature.
- 2 Check for leaks.
- 3 Check water pump packing nut adjustment.
- 4 Check cooling solution with suitable hydrometer to make sure of protection temperature.

Metal concrete forms can be readied for re-use faster

You can get metal concrete forms cleaned up and back on the job faster if you spray them, before use, with Texaco Stazon. Use the Stazon just as it comes from the container for best results. Field reports say it gives the concrete a fine smooth finish, and the Stazon prevents sticking, shortens clean-up manhours.

Magneto Lubrication: three IFs and a BUT

IF the magneto is oil-lubricated, apply a few drops of oil every 500 hours.

IF the magneto is grease lubricated, apply Texaco Marfak Multi Purpose 2 every 100 hours.

IF the magneto is located near the engine exhaust pipe, lubricate with Texaco High Temp Grease every 50 hours.

BUT if the bearings on your magneto are sealed, follow manufacturer's recommendations and let the distributor do the servicing.

Attachment on paver slopes pavement edge



Efficient equipment performance

Too-thin lubricant
may permit metal-to-metal
contact.



Too-thick lubricant will hold dirt,
pack in gear teeth, may damage bearings.

Key points in choosing gear lubricant for gyratory crushers

One of the toughest lube jobs on a gear-driven gyratory crusher is the gears themselves. They're partly protected by oil-tight cases and dust rings, but some contamination is inevitable, and it's essential that you choose a lubricant that can take it.

Viscosity is very important. These gears are very heavily loaded, so too-low viscosity may not provide a film thick enough to prevent metal to metal contact. On the other hand, if the lubricant is too thick, it will hold grit and dust in suspension, and let it develop a scoring action on the gear teeth. In addition, dust tends to dry out lubricants, and also creates a "packing" condition between gear teeth. This packing of dust and dried lubricant can build up undue pressure on gears and bearings.

Your best bet is a lubricant with a viscosity between 60 and 160 seconds Saybolt Universal at 210°F, with extreme pressure characteristics. These specifications will get you a lubricant with a good compromise between too thick and too thin. Ask any Texaco Lubrication Engineer to help you pick the right grade for your temperature zone.

TEXACO PRESENTS THREE NEW FILMS TO HELP BOOST YOUR PROFITS



1. PLAN FOR PROFIT—Texaco's newest color-and-sound movie. Dramatizes the major savings you can make with the proper investment of less than 1% of your total budget—the amount you spend on lubricants. Film features latest lubrication methods and equipment on a number of contracting projects, demonstrating the Texaco Simplified Lubrication Plan in action.

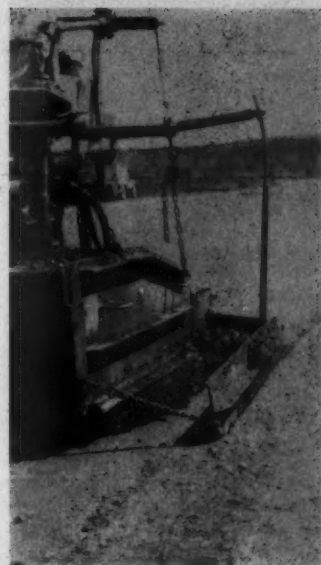


2. FUNDAMENTALS OF LUBRICATION—a brand new Texaco color slide film. A clear, concise once-over that defines technical terms like "viscosity" and explains specifically what lubrication is and what it does. This down-to-earth discussion will give the lubrication man a new understanding of the importance of lubrication, and a fresh interest in his work. It's supplemented with a manual that covers the same ground in greater detail.



3. LUBRICATION OF EARTHMOVING EQUIPMENT—a new slide film, in color. A concise, easy-to-understand analysis of proper lubrication of engines, wheel bearings, steering, track rollers, crawler treads, hydraulic equipment, wire rope, open and enclosed gears. Supplemented with a manual that covers the whole field of earthmoving equipment lubrication in greater detail.

FOR AN EARLY SHOWING of any one of these films—or all of them—contact your Texaco Contractor Representative now.



Bituminous - paving contractors across the country have come up with a variety of solutions for the problem of making a sloping edge on the outside lanes as they lay hot-mix pavements. The device the Bighorn Construction Co., Sheridan, Wyo., built and attached to its Pioneer bituminous paver is simple and inexpensive, and it produces very satisfactory results.

The attachment consists essentially of a flat steel-plate screed that is hinged to the outer edge of the finisher's screed box. A steel guide plate extends ahead of the screed to confine the bituminous mix and make a sharp, straight outside cutoff. An arm extending out from the side of the paver provides down pressure and vertical adjustment for the screed.

The outer edge of the paver screed box is left open so that the paver operator can force an excess of the mix out to that side. The screed strikes off this excess material to a neat slope and compacts it to approximately the same consistency as the rest of the lane being placed.

The attachment can be easily and quickly removed when not needed.

The pictures show the Pioneer paver with the edging attachment at work on the paving of Interstate I-90 north of Sheridan.

TEXACO LUBRICATION ENGINEERS

Every month or so we'll bring you a batch of "sleepers," little angles, so easy to overlook, where big savings in time and money can be made. If Lube Logic doesn't solve your problems, call your local Texaco man. Anytime, all the time, he's your best source of money-saving lubrication ideas. Don't forget that "Lubrication is a major factor in cost control." Texaco Inc., 135 East 42nd Street, New York 17, N. Y.

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"Sharp practices destroying federal-state highway partnership" —Scherer

Ohio Congressman tells AASHO that political decisions are being substituted for the judgment of engineers

Administrator Rex M. Whitton; and AASHO president D. H. Bray, Kentucky state highway engineer. Congressman John A. Blatnik (D., Minn.), chairman of the House subcommittee investigating the Federal Highway

Program, was also scheduled to speak but for the second consecutive year failed to make an appearance.

Caught in blizzard

Some of the nearly 800 delegates were delayed or had to fight their way through a fall blizzard that blocked highways in western Wyoming and Colorado on the eve of the meeting. In spite of the snow, the roll call of member departments was answered by representatives from all of the states, the District of Columbia, Puerto Rico, and the Bureau of Public Roads. Visitors from Canada, Mexico, and England were also recognized.



Rep. Gordon H. Scherer (R., Ohio). "... sharp practices ... and misuses of highway funds ... the most effective weapon for destroying the federal-state highway partnership."

"Shenanigans have been taking place in some quarters," Congressman Gordon H. Scherer (R., Ohio) reminded the delegates to the 47th Annual Meeting of the American Association of State Highway Officials at Denver last month. And he continued, "Some of these sharp practices and misuses of highway funds place in the hands of our opponents the most effective weapon for destroying the federal-state highway partnership."

The threat to the states of losing their senior-partner status in the highway picture was further emphasized in the several talks that dominated the meeting's general session. The speakers included Congressman George H. Fallon (D., Md.), chairman of the House Subcommittee on Roads; Sen. Pat McNamara (D., Mich.), chairman of the Senate Subcommittee on Roads; Congressman Clifford Davis (D., Tenn.); Federal Highway



Rep. George H. Fallon (D., Md.) chairman of the House Subcommittee on Roads.

"... emphasis ... on removing obstacles ... in connection with the administration of the program so that highways can be built ..."

Crush more tons per dollar . . .

BUY REPLACEMENT PARTS FROM THE COMPANY THAT BUILT YOUR CRUSHER

You buy a crusher because of the engineering experience the manufacturer has put into it to give you more production for your money. In the same way, the manufacturer of your crusher buys the experience and engineering abilities of the company which supplies certain components and replacement parts for it. The manufacturer profits only when you are satisfied with the performance of his product. That's why most big-name crushing equipment manufacturers work closely with AMSCO to give you replacement parts that fit perfectly, assure original equipment performance, and last a long time in the toughest conditions.

When it comes to wear parts, here's why most manufacturers insist on AMSCO. As long-experienced specialists in wear-resistant metals, AMSCO engineers alloys to exact formula needed to stand up under the abrasion-impact-pressure crushing conditions of your job. AMSCO cast parts are structurally perfect and contain the proper alloys for longest possible life.

AMSCO parts are patterned from manufacturer's drawings. They are built for your crusher . . . not copied from inaccurate field measurements. When you need mantles, concaves, jaws, rolls, plates or liners, get them from the manufacturer who built your crusher. He depends on AMSCO's experienced way with wear-resistant alloys to help you crush more tons per dollar.

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Committees study electronics

The application of electronics to almost every phase of the highway field was emphasized in a number of the technical committee sessions that dominated much of the 4-day conference schedule. These ranged from the nuclear moisture-density testing devices through data-processing machines used in survey, design, and right-of-way functions, to the electronic road. The latter would take over some of the duties of the automobile driver.

One unique example of electronic application was an actual demonstration of teleprocessing field data from

Federal Highway Administrator Rex M. Whitton, right, presents the Thomas H. MacDonald award for outstanding service in highway engineering to W. A. "Bill" Bugge, Washington State Director of Highways. Bugge is also a past president of AASHO.

the convention headquarters in Denver to the Ohio Department of Highways headquarters in Columbus, and return. Ohio is already using such transmissions between its division offices located throughout the state and highway headquarters. The hotel meeting room took the place of a division office as right-of-way data, punched out on some 40 IBM cards,



was transmitted across the country to Columbus.

There the information was processed on other cards, more data was added, and the revised information was transmitted back to Denver. The processing of information was done on IBM key punchers, verifiers, and transceivers, while the actual transmitting was done over a regular telephone network by the Bell System's new Data-Phone service. The round trip, both processing and communicating, took about 30 minutes. Via air mail, this operation would have taken at least three days.

At a session of the Emergency Planning Committee (Operation Alert), a telephone interview was held with the North American Air Defense Command in Colorado Springs. Delegates questioned a NORAD officer and were answered through an amplifier set up in the meeting room. This served to dramatize the readiness program that is being urged on the individual state highway departments by the committee chairman, Everett S. Preston, Ohio director of highways. A film, "Seconds for Survival," also was shown to the group.

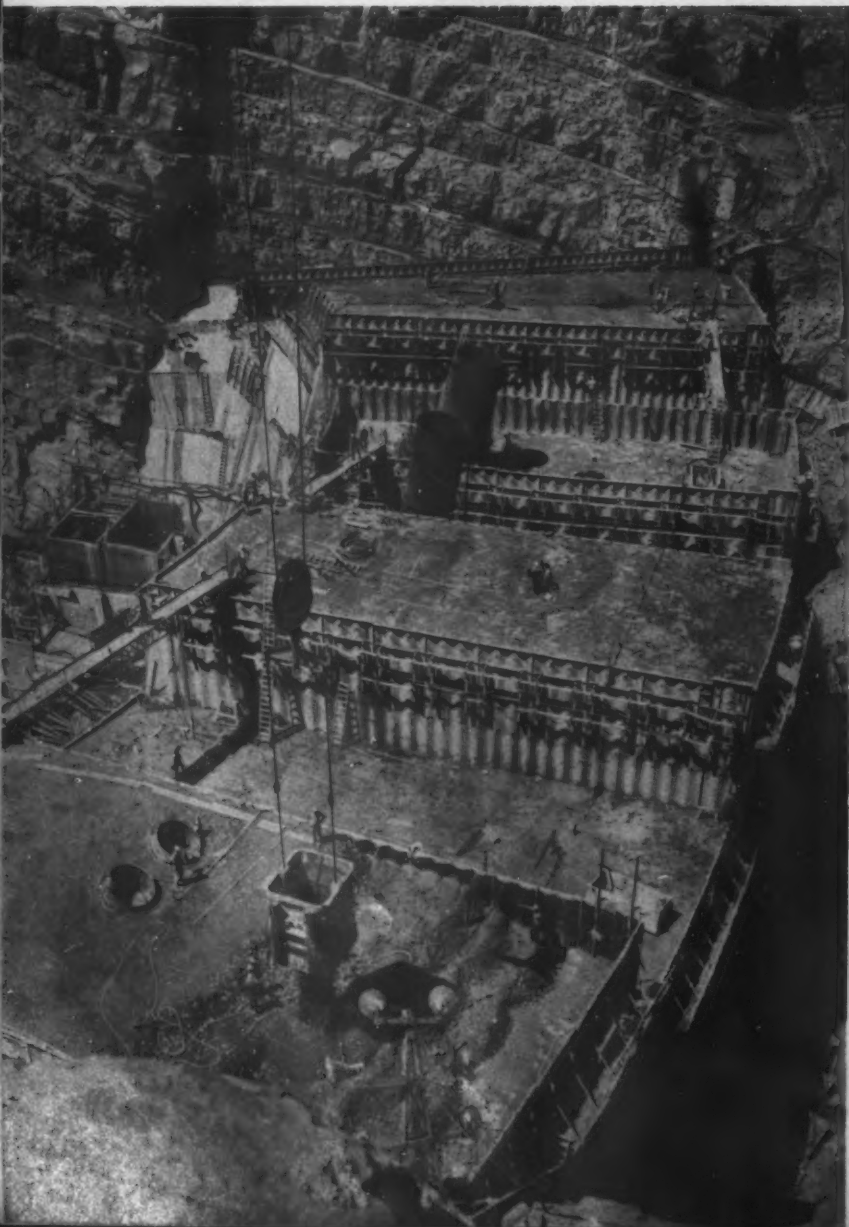
Womack becomes president

Officers for the coming year were installed at the final general session. They are: president, J. C. Womack, Calif.; first vice president, J. C. Mackie, Mich.; vice president Region I, W. R. B. Froehlich, Pa.; vice president Region II, H. H. Harris, Va.; vice president Region III, Walter Johnson, Kans.; vice president Region IV, G. B. Bennett, Idaho; and treasurer, E. L. Roettiger, Wis. THE END



Taking over the reins as AASHO president this year is J. C. Womack, state highway engineer and chief of the Division of Highways for California.

← For more facts, use Request Card and circle No. 246



Limited space at Flaming Gorge Dam makes material-delivery and concrete-placement schedules of prime importance. Only enough material is on hand at one time for less than half a day's work. Five sizes of aggregates are stockpiled, left. Recovery tunnels run to the rescreen at the top of the Noble plant. A shuttle car brings concrete to a loading dock where the cableway bucket loads. High on the left abutment are silos for storage of cement and pozzolana. Down on the dam (photo at left), the self-charging hydraulic gates are tripped and the bucket rises rapidly.

Precise scheduling of work means

No bottleneck at Flaming Gorge Dam

Scheduling is the contractor's big problem as concrete placement at Flaming Gorge Dam hits the planned pace of 75,000 to 80,000 cubic yards per month. Since the dam contains an almost constant 2,000 cubic yards per foot, this pace represents an average rise of nearly 40 feet per month.

One of the key elements of the Bureau of Reclamation's Upper Colorado River Storage Project, the dam is located on the Green River in northeastern Utah, about six miles from the Utah-Wyoming state line. The thin-arch dam will rise just over 500 feet above bedrock, making it the seventh highest concrete dam in the United States. It will contain slightly less than a million cubic yards of concrete.

The impounded reservoir will extend upstream about 91 miles, to within a few miles of the city of Green River, Wyo. At maximum normal water-surface elevation, it will store nearly 3,800,000 acre-feet of water. The power plant will include three generators with a total capacity of 108,000 kw.

The dam is being built for the U. S. Bureau of

CONTRACTORS AND ENGINEERS

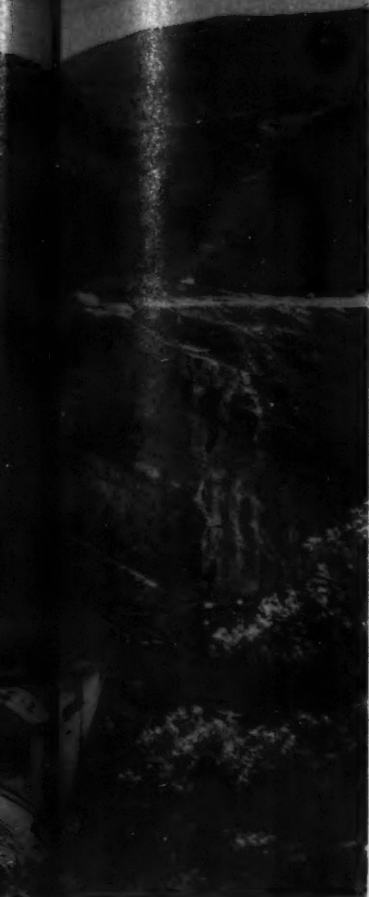
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NOVEMBER



(Additional photo on front cover)

RALPH MONSON, field editor

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MINES

Reclamation by a joint venture known as Arch Dam Constructors. Headed by Peter Kiewit Sons' Co., the group includes Morrison-Knudsen Co., Inc., and Mid Valley Utility Constructors, Inc. The bid price for the project was \$29,602,497.

Storage limited

The scheduling problems are caused by the limited storage for aggregates, cement, and pozzolana at the dam site and are projected in both directions. Because of the limited storage, the production and delivery of aggregates must be carefully coordinated with the output of concrete. This is complicated by the variety of types of concrete in use; all have different proportions of the several ingredients.

Cement comes some 200 miles by truck transport from the Ideal Cement Co. plant at Devils Slide, Utah. Pozzolana from the Great Western Aggregate Co. at Laramie, Wyo., comes by rail to Green River and then by truck to the job. The problem of keep-

(Continued on next page)



Geared by FULLER

The Model C Tournapulls that cut through overburden for the Georgia Coating Clay Company feature 8V-71 GMC engines, Fuller L-1220 Transmissions and pull 20-yard pans.

Georgia Mining Company uses L-W's in getting down to KAOLIN

To get to the pure white kaolin they mine for the production of china and paper, the Georgia Coating Clay Company of Macon has to strip off anywhere up to ninety feet of overburden.

Two LeTourneau-Westinghouse V-Power Model C Tournapulls are kept on the move throughout the company's area to strip off the overburden of red clay, fuller's earth and gumbo. Used in continuous operation at many mine locations, these machines lay

open the rich veins of kaolin so that shovels and trucks can bring out the pure white clay.

Arthur Yates, Shop Foreman for Georgia Coating Clay, is more than satisfied with his new V-Power C-Pulls. "This C with the 290 hp V8 engine outperforms anything we've ever seen. Naturally we specified the Fuller L-1220 Transmission—we've been using Fullers for quite some time, and have nothing but the best to say about them. The L-1220 gives

us an even flow of power from the big V8 engine, and we get no vibration. And then the Countershaft Inertia Brake built into the Fuller Transmission provides quick upshifts for constant operation at peak horsepower, while the Pressure Lubrication and Filtration System assures us of full transmission oil flow and keeps the gear lube clean. We like the Fuller; it's a simple, heavy-duty transmission that has given us nothing but the most reliable service."

FULLER TRANSMISSION DIVISION
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For more facts use Request Card and circle No. 247



A full 8-yard Blaw-Knox bucket starts on its way to a block after being filled by one of the two Noble hoppers on the shuttle car. After it picks up the second 8-yard load, the Davenport locomotive will push the shuttle car back to the plant to be recharged.



At the aggregate screening and washing setup, minus No. 8 is separated and sent to the sand plant. The 3 and 6-inch sizes go to stockpile; smaller sizes to the heavy-media plant.



Sand is sized and dewatered in this Eagle classifier and dewatering screw. From here it goes to the heavy-media separation plant where the lighter material is removed.

(Continued from preceding page)

ing an adequate supply of these materials on hand without paying excessive demurrage is obvious.

Even with the supply lines matching the concrete output perfectly, there are other important considerations. One of these is maintaining the sequence of operations on the dam: concrete placement; raising forms; placing embedded items; and cleanup. It is important to have a spot always available to place concrete, since placement is a continuous 3-shift operation.

Another continuing problem is that of scheduling the work for the project's twin cableways, which operate from a common stationary head tower on the left bank and twin moving tail towers on the right bank. Since the cableways cannot overlap, the work must be carefully planned to keep one rig busy placing concrete while the other does the yarding and incidental work.

Plant supplies concrete

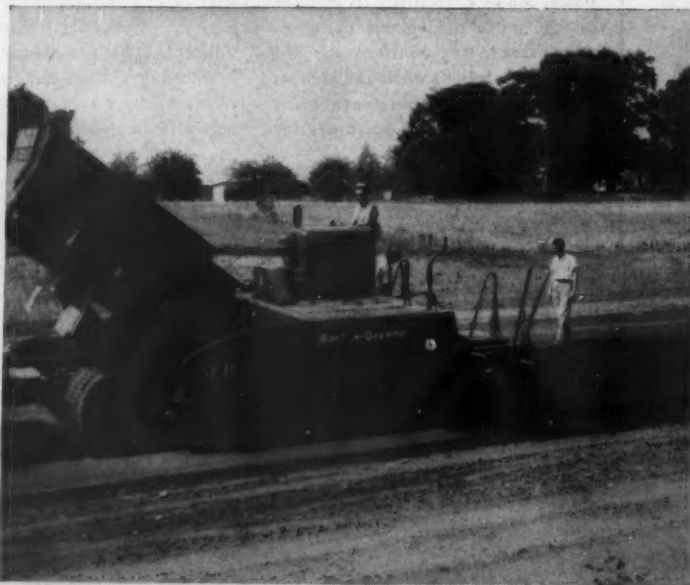
The job's Noble concrete plant is set up on a narrow bench near the top of the left abutment. The five sizes of aggregates are delivered by a fleet of Challenge-Cook Bros. bottom-dump trailers pulled by Mack trucks. The rigs unload on a bridge over the five stockpiles that constitute the entire reserve supply at the site. At full capacity, this storage contains aggregates for a maximum of 2,000 cubic yards of concrete—less than half a day's run.

Two conveyors in recovery tunnels under the stockpiles pick up the aggregates and deliver them to the rescreen at the top of the concrete plant. One conveyor handles sand, while the other delivers the four sizes of coarse aggregates.

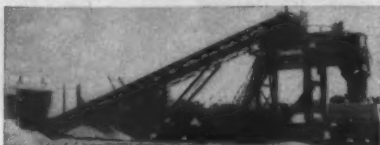
Under the rescreen, the plant's five bins hold 750 cubic yards of aggregates, which range from sand to 6-inch rock. Below the bins is the semiautomatic weighing equipment and, below that, the mixer deck with four Smith 4-yard mixers.

Two big silos perched on the hillside above the concrete plant provide the bulk storage for cement and pozzolana. The cement silo holds 7,000 barrels and the pozzolana silo 5,000

"MY CONTRACTOR POLL SHOWED BARBER-GREENE WAS THE BEST PAVING PACKAGE INVESTMENT"



SA-40 REPORT. Fast paving speed and ease of operation highlight foreman Bill White's comments on this new SA-40. White reports initial black base course (4" lift, 12' wide) was easily handled at 200 tons per day.



MODEL 828 SELF-ERECTING STABILIZATION PLANT is one of four models in Barber-Greene line producing 200 to over 600 tph at lowest cost.

World's No. 1 Manufacturer of Asphalt Paving Equipment

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are the two Wemco heavy-media separation plants—for sand, left, and aggregate. Rock discharged from the plant goes up the conveyor in the foreground.



Finished aggregates are recovered from stockpiles and sent to loading bins like this one, where a Challenge-Cook Bros. bottom-dump pulled by a Mack picks up a 30-ton load.

Sherman Simpson, veteran Mt. Airy, N. C., contractor, tackles first asphalt paving jobs with 894 BatchOmatic and SA-40 Finisher after checkup on competitive equipment

Contractor Sherman Simpson, Mt. Airy, N. C., tells why he bought a Barber-Greene paving equipment package when he recently branched out into the asphalt paving field:

"In my 32 years association with contractors, the name Barber-Greene seemed to stand out among asphalt paving equipment manufacturers—but I wanted to be doubly sure. So, I polled some good contractors. Barber-Greene and two other makes were most recommended. I went further and checked owners of this type equipment and found Barber-Greene way out front. That's when I ordered my Barber-Greene 894 BatchOmatic plant and SA-40 asphalt finisher."

"I got another winner, too, in the distributor—Carolina Equipment Co. Past experience with them makes their people tops on my list," he adds.

When you need an asphalt paving equipment package, or just an asphalt finisher or stabilization plant, take your own contractor preference poll.

You'll get further proof why modern Barber-Greene BatchOmatic and Continuous asphalt plants are industry leaders for lower cost high capacity production, most accurate and automatic operation, lower maintenance, and the ultimate in portability when required.

You'll discover Barber-Greene finishers—the General Duty SA-40 and 879-B, the Heavy-Duty SA-60 and SB-60 models, and the Compact 873 have one common feature: lowest cost paving per ton.

You'll find all sizes of Barber-Greene stabilization plants preferred for high capacity, controlled mixing with minimum maintenance.

barrels. Fuller Airlalides join these silos with the two 500-barrel silos at the concrete plant. Augers feed the materials to the batching scales.

Although the plant has a rated capacity of 350 cubic yards of concrete per hour, this job does not place that kind of demand on it. At full-scale operation, the usual output is less than 200 yards per hour. No refrigeration is required.

Cableways place concrete

A shuttle car, carrying two Noble 8-yard hoppers and pulled by a Davenport locomotive, carries the concrete from the plant to the loading dock just a short distance away. The hydraulic gates of the hoppers transfer the mix directly to the Blaw-Knox 8-yard bucket on the cableway.

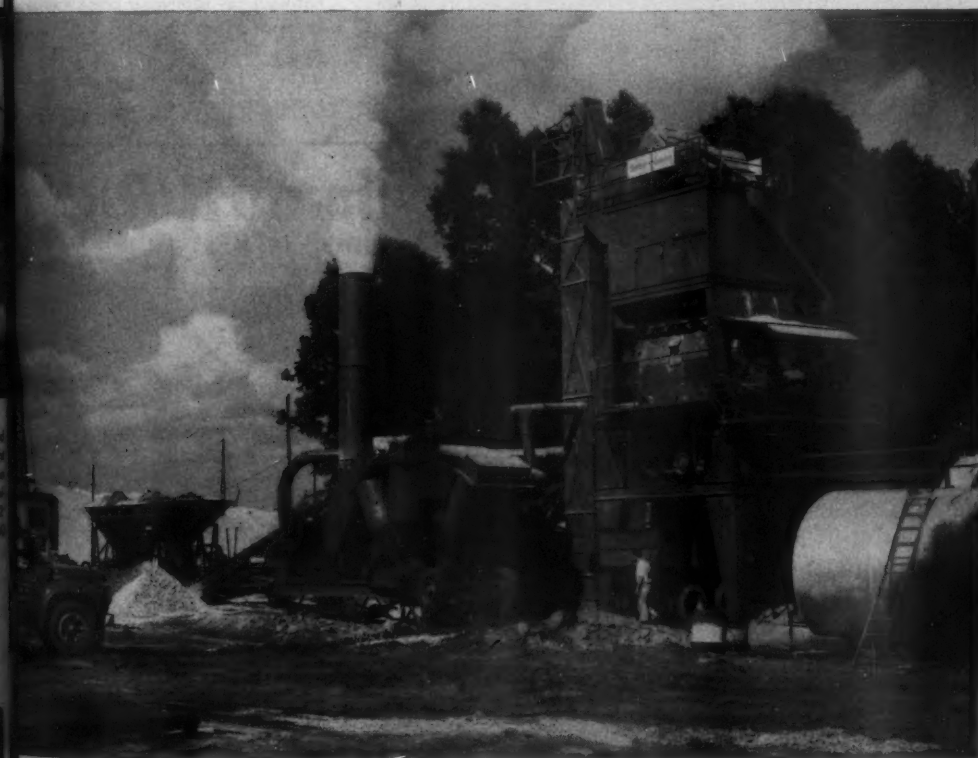
The twin Washington Iron Works cableways have 3¼-inch locked-coil track cables spanning 1,900 feet between a single 56-foot head mast and a pair of 75-foot traveling tail towers. There is a difference in elevation of 165 feet between the head and tail towers.

Each cableway has a 25-ton carriage riding the track cable on twelve sheaves. The carriages feature twin button lines and two "buck-boards" that pick up the button-line slack as the carriage travels in either direction. The 1½-inch hoisting line is reeved through 64-inch sheaves.

During placement, the bucket is never removed from the cableway. It lands at the loading dock and gets its 8-yard load from the shuttle car in a few seconds. At the placement area, the self-charging hydraulic gates are tripped to discharge the load and send the bucket on its way back to the dock.

One of the cableways places concrete continuously on a 3-shift basis five days a week. The second rig does yarding on the day shift and usually places concrete on the swing shift in the powerhouse and outlet works. It is not ordinarily used during the third shift.

A small amount of concrete in the powerhouse area must be rehandled, since it is beyond the reach of the cableways. This concrete is dumped into a transfer hopper in the powerhouse area and discharged into smaller buckets that are handled by



PRODUCTION BONUS. Simpson's 894 BatchOmatic shown mixing H8 black base for road resurfacing job at Grove, N. C. Plant Foreman, J. D. Young reports: "The is rated at 1,500 tons daily, but we are mixing up to 2,070 of black base in 12 hours, and that included two hours of for trucks." Plant is equipped with DA:65-CA:65 dryer-

pac, four-bin cold feeder and a Model PA-70 conveyor. Contractor Simpson says, "We'll set this plant up on permanent location soon. Then, I'll need another plant and you can bet it will be a Barber-Greene." Closeup of automatic controls are shown at upper left.

For more facts use Request Card and circle No. 248

(Continued from preceding page)

a Manitowoc 4500 crawler crane serving this area.

The work cycle on the dam is a continuous repetition of four basic steps on each block. These are: raising the forms; installing embedded items; cleanup; and concrete placement.

The 7½-foot lifts are formed by Blaw-Knox cantilever steel forms. They are raised manually by a crew using a series of steel A-frames fitted with Beebe hand winches. The forms are secured by insert anchors installed in each lift.

The specifications require a minimum of 72 hours between lifts on any block, a maximum height differential of 30 feet between adjacent blocks,

and a maximum over-all differential of 52 feet. At peak production, as many as 3½ blocks are placed per day in order to get a complete lift across the dam each week.

Shale seams are sealed

While the canyon walls—the abutments of the dam—are essentially of hard rock, a number of softer shale seams required special treatment. These range in thickness from a few inches to about 10 feet. The shale was excavated back into the canyon walls to varying depths, depending on the nature and depth of the seams, to form a vertical face. In some of the deeper seams, which exceeded 2 feet in thickness, this excavation took the form of drifts at the upstream heel and downstream toe extending



designed in an hour* and erected in 4 days . . .



by Mahoning County Highway Dept., Youngstown, Ohio

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*Size and gauge selected from tables based on past performance records.

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Illumination for night operations throws the concrete arch dam into relief. The round-the-clock operations will bring the dam to completion in mid-1963.

as far as 80 feet back from the face of the abutment into the keyway. The excavated drifts were backfilled with concrete pumped into place by Pumpcrete, and the arch was grouted under high pressures.

The prime contract for Flaming Gorge was awarded in July, 1958.

The diversion tunnel through the right abutment was also started in 1958, and the river was diverted through it in 1959. Excavation for the dam started in the fall of that year and continued on through the winter and into the 1960 season. The prime contract is scheduled for completion in July, 1963.

Since the available sources of aggregates in the area contain considerable quantities of shale and other unsuitable materials, the production of concrete aggregates is one of the ma-

jor problems. The aggregates are being developed from a gravel deposit in the reservoir area some 15 miles upstream from the dam site. A heavy-media separation plant removes most of the objectionable materials.

In the gravel pit, a spread of Caterpillar DW21 scrapers with a D push tractor excavates the gravel and delivers it to a drive-over hopper at the plant. The minus 8-inch material passes through a scalping screen and is conveyed to a trommel screen for the initial separation. A minus No. 8 is processed through an Eagle sand classifier.

The coarse aggregates continue through the screening plant and are separated into five sizes with maximums of No. 4, ¾, 1½, 3, and 6 inches. The 3 and 6-inch sizes go directly to stockpiles.

Need HOSE in a HURRY?

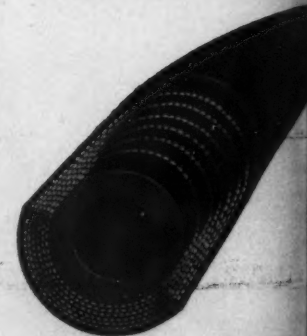
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Built for work up to 100 p.s.i., this hose is made with special heat-resistant rubber tube, plies of quality frictioned duck or heavy rubber separation and tough rubber cover. Sizes: ½", ¾", 1", 1¼", 1½", 2". Ask for catalog showing complete line of CONTRACTOR HOSE, HOSE FITTINGS, BOOTS and CLOTHING.

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For more facts use Request Card and circle No. 250

CONTRACTORS AND ENGINEERS

Crews work the cantilever works trash to concrete

The No. 4 combined ¾ are convey plants for 1 cent of the gravity below are handle plants empl of separation

The aggregate the top of a taining the 65 per cent magnet ities to kee 2.5. The mat motion arou materials flo a weir. The the bottom washing scre Both the f on screens media. The netite are re water by m returned to constant spec From the ¼ and 1½-h arated and stockpiles, wh dined with th fore it is sen bins.

The several recovered fr veyors and loading bins units are qu The haul u lected to fit th include high- with reason with a consid traffic using Challenge-Co 50 tons per tractora have and other fea the job cond or nine of th shuttle the m to the job site at the concret has twelve u care of all em

NOVEMBER, 1962

Crews work on the left side of the cantilever base for the outlet-works trash-rack structure prior to concrete placement.



The No. 4 to No. 8 sand and the combined $\frac{3}{4}$ and $1\frac{1}{2}$ -inch aggregates are conveyed to the heavy-media plants for removal of some 20 per cent of the material with a specific gravity below 2.5. The two materials are handled in separate Wemco plants employing the same method of separation.

Heavy media

The aggregates are introduced into the top of a conical steel vessel containing the heavy media, which is 65 per cent ferrosilicon and 35 per cent magnetite in the proper quantities to keep a specific gravity of 2.5. The materials travel in a circular motion around the cone. The lighter materials float and are drawn off over a weir. The heavy material settles to the bottom and is forced up to the washing screen by compressed air.

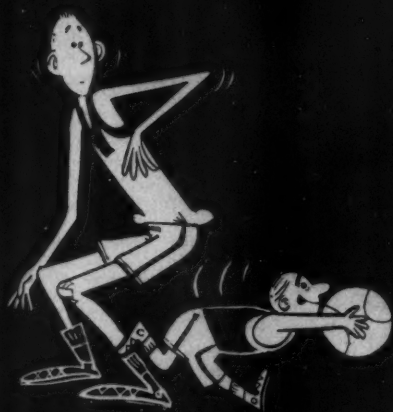
Both the float and sink are washed on screens to remove the heavy media. The ferrosilicon and magnetite are recovered from the wash water by magnetic separators and returned to the cone to maintain a constant specific gravity there.

From the heavy-media plants, the $\frac{3}{4}$ and $1\frac{1}{2}$ -inch aggregates are separated and sent to their respective stockpiles, while the sand is recombined with the minus 8 fraction before it is sent to the truck shipping bins.

Haul to plant

The several sizes of material are recovered from stockpiles by conveyors and delivered to overhead loading bins from which the haul units are quickly loaded.

The haul units were especially selected to fit the job conditions, which include high-speed travel on a road with reasonably steep grades and with a considerable amount of other traffic using the same road. The big Challenge-Cook Bros. trailers carry 30 tons per load. The Mack truck-trailers have Cummins diesel engines and other features that fit them to the job conditions. Although eight or nine of the units can ordinarily shuttle the materials from the plant to the job site and maintain supplies at the concrete plant, the contractor has twelve units on hand to take care of all emergencies. THE END



Suddenly you "Made a Score"

because you "RAN THRU THE OPPOSITION" and "found" the most UNUSUAL Christmas gift-giving idea for customers, employees and friends EVER SEEN!

...and your customers, appreciating your "HEROICS" would call to say "THANK YOU" for your unique and wonderful remembrance and thereby open the door to ADDITIONAL SALES! Even your employees and friends showed their appreciation in the many small ways ONLY YOU would understand.

If YOU buy gifts (between \$7.50 and \$100.00 each), you'll surely want to see this unusually practical, sensationally simple and refreshingly different way of saying "THANK YOU" to the people who are IMPORTANT TO YOU AND YOUR COMPANY.

WRITE TODAY FOR
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Automated Gift Plan, Inc., 60 Park Avenue, New York 16, N. Y.

Please send further information about your 1961 Gift Bookard program.

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We use approx. _____ Gifts in the \$7.50 to \$100.00 price range.

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Labor Review

AFL-CIO issues call to Miami Beach convention beginning December 7

AFL-CIO has issued the official call to affiliates for the fourth constitutional convention, which begins December 7 at the Americana Hotel in Miami Beach, Fla.

The call emphasizes two problems—the danger of war and the persistence of unemployment—saying that, in the past two years, "The Soviet Union's threat to world peace and the unsolved need to achieve full, productive use of America's human resources cast a shadow over the record of solid achievement."

The call says that "we in the labor movement must fulfill without stint the heavy responsibilities we bear. . . . We cannot afford the luxury of divisive quarrels; the times demand the best that is in us all. We must be united in our common purpose."

The call sets up this formidable task for the convention:

"To shape a program for the perfection of American society and the full utilization of its human and material resources; to evolve, with that end in view, a campaign to expand the labor movement and confound its enemies; to strengthen our country and the free world against the communist peril, and as a basic prerequisite for all these goals, to reaffirm and enhance the solidarity of our movement."

New Jersey boilermakers get 49 cents more over next three years

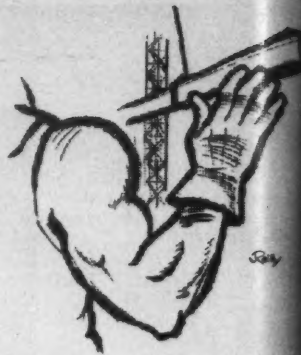
Striking members of Boilermakers Local 28 in northern New Jersey accepted a new contract providing them with 49 cents in wage increases over the next three years.

The new agreement ended a 12-day strike that halted several construction projects in the northern New Jersey area.

The contract provides a 15-cent hourly pay hike retroactive to August 1 of this year, another 15 cents beginning August 1, 1962, and a final 19 cents in 1963.

In addition, the agreement includes a 1 per cent increase in contributions to the employees' pension fund.

Local construction firms employ-



ing boilermakers originally had offered only a 30-cent pay hike over the 3-year period, while the union has sought a 25-cent hourly increase in a 1-year agreement.

The initial 15-cent increase raises the base rate for journeymen to \$6.45 an hour. In addition, employers pay 1 per cent for welfare, and with the 15 per cent increase, 3 per cent for pensions.

Pittsburgh heavy laborers accept compromise offer, end 2-month strike

A 2-month strike that tied up an estimated \$40 million worth of heavy and highway construction in the Pittsburgh, Pa., area was settled, spokesman for the Constructors Association of Western Pennsylvania announced.

The nub of the strike centered around the union's demand for an exclusive hiring hall and a 17½-cent an-hour increase.

The deadlock ended when the union accepted an association offer of a 16½-cent increase for 1961, and a 10-cent increase scheduled for December 31, 1961.



The agreement, which denies the union an exclusive hiring hall, ends December 31, 1962.

Current base rate for heavy laborers is \$2.91½ an hour, from which 10 cents is deducted for health and welfare, and another 10 cents for pension.

Atlanta ironworkers sign 2-year contract—30 cents more per hour

Atlanta, Ga., ironworkers and contractors agreed on a 2-year contract that will add a total of 30 cents an hour to wages.

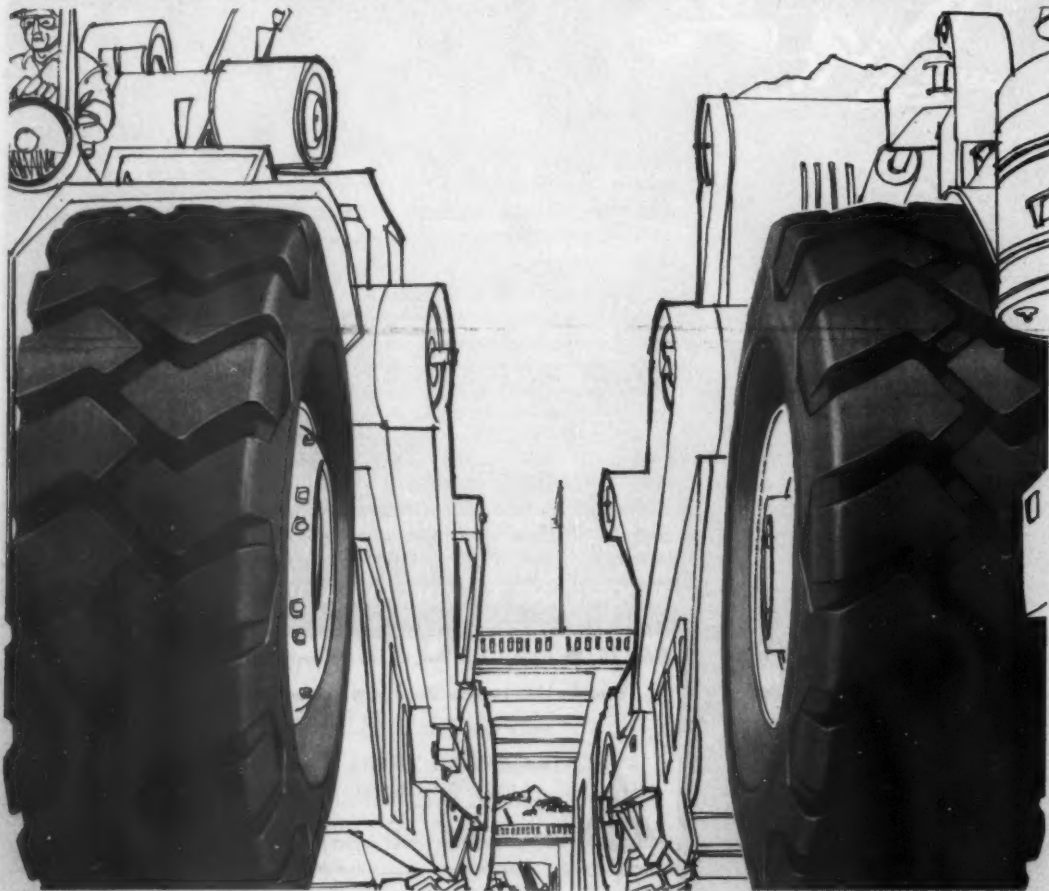
Ironworkers, who now make \$3.70 an hour, will receive \$3.80 an hour on January 1, 1962. Another dime will be added to wages June 15, 1962, with the final dime on January 1, 1963.

WHEN SO MUCH DEPENDS ON YOUR TIRES . . .

COUNT ON FIRESTONE TO BEAT TOUGH SCHEDULES!

Construction job records prove that the built-in stamina of Firestone Super Rock Grip Wide Base giant tires cuts downtime, keeps equipment rolling on schedule. With the super strength of Firestone Rubber-X and Shock-Fortified nylon cord bodies, they take the most punishing blows from rocks, stumps, snags—and roll right on to get the job done.

Always on call, too, is a Firestone Tire specialist to help you solve any tire trouble (he can often spot potential problems before they arise!). To multiply production and profits with this Firestone team—Giant Tires plus Giant Tire Service—simply call your Firestone Dealer or Store.



Firestone

Always Specify Firestone Tires When Ordering New Equipment

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For more facts, use Request Card and circle No. 252

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Foreign Projects

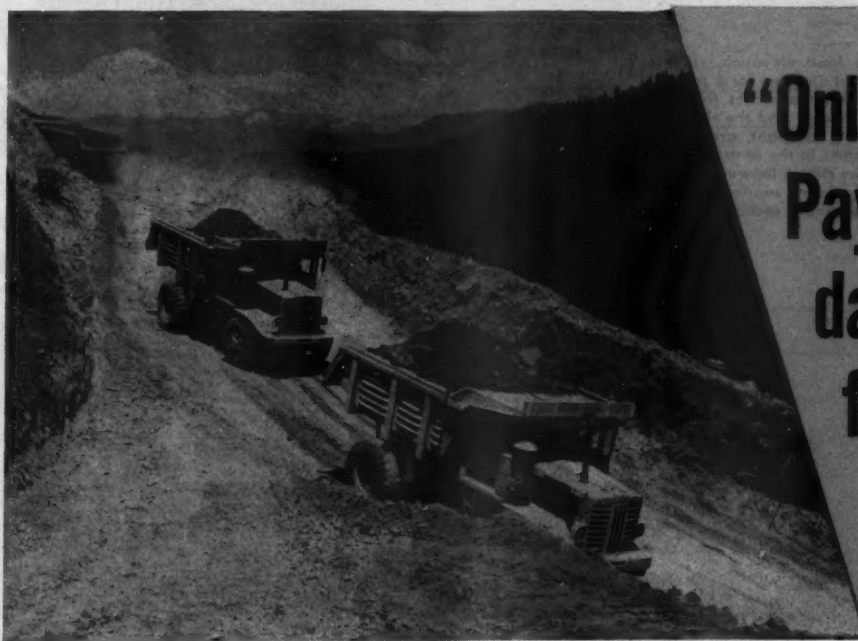
Division and power tunnels are partially built, and nearly \$7 million in new construction equipment is on the job 24 hours a day to finish a 436-foot-high rock-filled dam, part of Taiwan's \$45 million irrigation and power project. Tippetts-Abbett-McCarthy-Stratton, New York City, are consulting engineers, and the Morrison-Knudsen International Construction Co. is directing construction for the Shihmen Development Commission.

Switzerland's building boom has been given a boost by the importation of about 150 Oliver OC-96 backhoe-equipped crawler-tractor loaders. Swiss contractors say excavation time has been cut one-fourth because of the rigs' ability to dig through rock-strewn terrain. This one is working near Zurich.

Tunnel steel is loaded for one of the diversion tunnels of a hydroelectric dam at Infiernillo, Mexico, by a Unit mobile crane. The dam is being built by Associated Civil Engineers for an expansion program being carried out by the Federal Electricity Commission. The structure will have an underground powerhouse, said to be the largest in Latin America.

For more facts, use Request Card and circle No. 253

NOVEMBER, 1961



Exclusive Torqmatic brake lets International Payhaulers speed full 27-ton loads down the mountain—a dangerous trip in any other rig. Early in the job, when this steep grade was too much for

other haulers, six 95's kept production going. This is the toughest section of Slate, Hall & Hamilton's \$8,000,000 roadbuilding contract.

"Only Payhaulers dare move full loads down this 38% grade!"

Other rigs sit idle while "95" Payhauler units move 27-ton loads down mile-long haul road...

Slate, Hall & Hamilton of Portland are building 4-lane US Route 5 through Oregon's rugged coastal range. Contract calls for moving 4,800,000 cu. yds. of 20% rock material. Toughest part of the job is 330-ft. cut through high rocky outcrop above the Sacramento River. Existing Route 99 and main line of Southern Pacific Railroad—both kept open—run between the job and the river. Haul roads, crowded against the cliff, are steep and narrow, with hairpin curves.

carry half a load. Thanks to that Torqmatic brake, we're getting full production from the Payhaulers!"

Downgrade hauling stability is built right into the Payhauler. Positive Torqmatic braking, standard equipment on the 95, gives the operator confidence to use best haul speeds, even on the steepest grade with a full load. Fingertip power steering and convenient brake control lever further increase operator ease and safety—add up to extra haul cycles on every job. Prove to yourself how the 27-ton 95 or the 19-ton 65 will boost production on your spread. Call your International Construction Equipment Distributor and arrange for a Payhauler demonstration today!

"I wish we had more Payhaulers on this hill," says Owner E. D. Slate. "They took out full loads on a mile-long road with a 38% grade where we didn't dare put other trucks. Even after we cut the maximum grade to 28% other rigs only

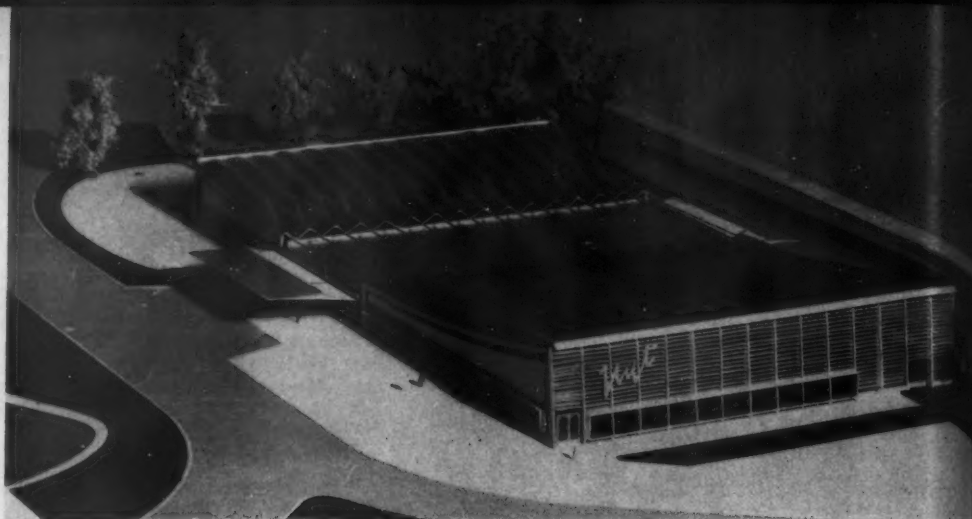


International Construction Equipment

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Illinois
A COMPLETE POWER PACKAGE

Engineering

Model of the supermarket illustrates the fluted roof of the 269 x 138-foot building. The larger and higher market section, foreground, is separated from the cafeteria-bar (rear) by a central service area.

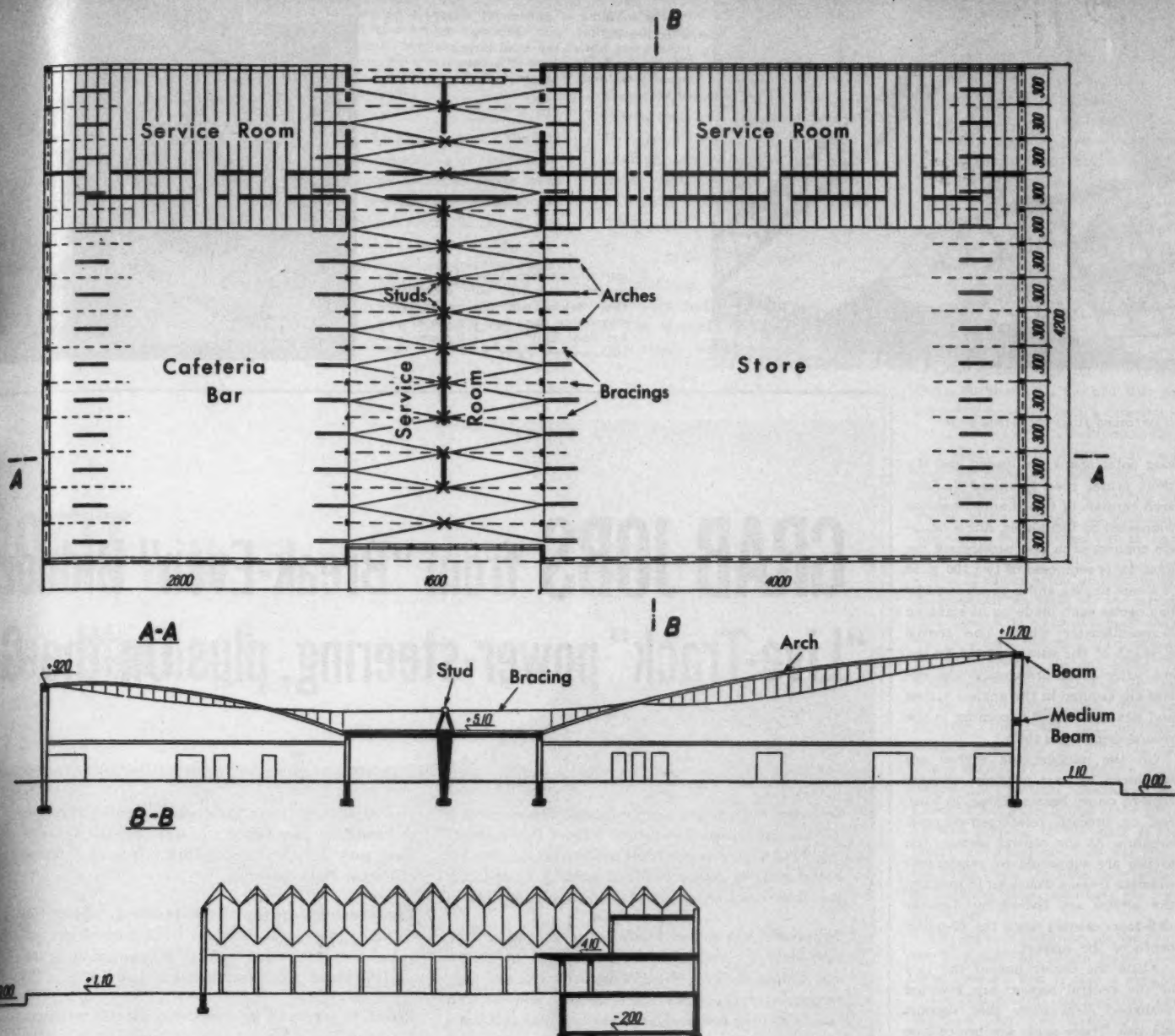


Structural network of the front elevation, right, resembles a bending moment diagram for a three-span continuous beam where the arches for the two long outer spans are loaded, and the shorter center span is unloaded. At far right, arch ribs span out from concrete frames in the central service core. The prestressed ties stretch between edge beams at each end of the building, supported also by studs on the roof of the central section.



Prestressed-concrete beams in the solid-looking central service area take the horizontal reaction to the arch ribs. Steel-frame studs on the roof support the tension members that extend across to the edge beams atop the outer rows of columns.





Roof for supermarket supported on Prestressed continuous steel arches

continuous

by WILLIAM H. QUIRK, editor

Polish architects and engineers working together have developed a unique design for the construction of a supermarket now being built in Warsaw. Art and science are blended in the roof-support design so that the structural members, before being enclosed, graphically illustrate the engineering calculations of the designers. The effect is obtained by using alternate compressed and tensioned members to support a lightweight roof that spans 40 meters (131.2 feet) in the main display area of the store and 26 meters (85.3 feet) in the cafeteria-bar.

"Super-Sam," as the market is called, stems from the English "super," a word that has crept into the Polish language, and the Slavic "sam" meaning self, or "big self-service" market. The new building, first of its kind in Poland, has a front elevation 82 meters (269 feet) wide and a depth of 42 meters (138 feet). The structure is divided across the front into three parts. At the west end is the 26-meter cafeteria-bar. A central 16-meter (52.5-foot) section is a service area for storage, kitchen, and refrigeration units. At the east end, with a 40-meter span, is the market or store proper.

Mezzanine floors at the rear of both the bar and market areas will also be given over to storage, service functions, and administrative offices. The one-story structure, with its sections of mezzanines, gives Super-Sam a total floor area of 4,700 square meters (50,520 square feet). Height varies with this asymmetrical 3-section design. The central service area has a uniform 5-meter (16.4-foot) height. The cafeteria-bar goes from this dimension to a height of 9.2 meters (30.2 feet) at the outside west wall. The market rises from 5 meters to 11.7 meters (38.4 feet) at the outside east wall along Pulawska Street. The supermarket is located just off Lublin Union Square and will serve the southern quarters of the city.

Suspended roof

The lightweight suspended roof over the two end sections of the building permits clear spans, devoid of columns, in both areas. The suspension system is composed of convex steel arches with prestressed concave ties.

In elevation, a steel roof arch with its tie resembles a bending moment diagram of a 3-span continuous beam, where the two



Setting in place a portion of steel arch-rib section with bracing. A truck crane places the steel in position on scaffolds where it is assembled by welding it to other portions of arch.

Intricate pattern of steel shows the graceful arch ribs with prestressed ties. Below are the cantilevered mezzanine floor and the main market floor built of 1 X 2-meter precast-concrete slabs.



(Continued from preceding page)

long outer spans are loaded and the short center span is unloaded. Each arch consists of two channel sections connected by fish plates. Angle hangers connect arch and prestressed tie. Each tie is composed of two 100 X 50 X 8-mm angles, and is prestressed by two cables each made up of eighteen 5-mm-diameter wires. The tensile strength of the wire is 17,000 kg./sq. cm. After being prestressed, the cables are grouted in the angles. Arches and ties are formed according to the second-degree parabola.

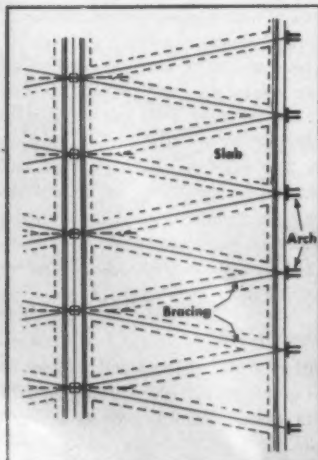
On the outside, the arches are supported by cast-in-place concrete edge or crown beams. These, in turn, rest on precast, reinforced-concrete columns. At the central section, the arches are supported by reinforced-concrete frames. Fourteen in number, the arches are spaced on 3-meter (9.9-foot) centers down the 42-meter depth of the market.

Along the center line of the roof of the central section are inverted V-shaped steel studs that support the ties. These studs are projections of the center row of columns extending upwards from the foundation.

To form the complicated shape of the two end hall roofs, specially bent wood planks were used. They rest on the arches and ties. Roofing material is galvanized steel sheets.

Pile foundation

The central section is founded on rows of Frankl piles with 90-ton bearing capacity, and which extend down into the clay soil 18.5 meters



Arrangement of triangular roof sections of central area.

GRAB JOBS from "Break-Even" Bidders RO "Live-Track" power-steering, plus On-the-Grower

To make a turn, you simply change the speed of a TD-25 track with "live track" Planet Power-steering. This way, you keep full power and traction on both tracks to assure full-load turning. Load-limiting "dead-track drag" doesn't sabotage your bids.

To handle big offset loads, or to counteract the side draft of benching without sluicing or "bank-noeing," simply shift the TD-25's load-side track to high range; leave the other track in low. You stay on course, deliver full loads or make full cuts, full time.

To keep full loads on the move, full time, through tough or easy going, use instant-acting, on-the-go

Hi-Lo, power-shifting. Cut-to-fill matching of power to condition goes far to prevent payload spillage. Fast, easy TD-25 power-shifting is a built-in bonus of Planet Power-steering!

For constant-contact push-loading, apply full TD-25 power with planetary track control, get full speed and production without scraper-mauling impact. Prevent push-block banging damage.

Prove to yourself how turning affects earning. See how TD-25 advantages let you grab jobs from "break-even" bidders and still make profits. Let your International Construction Equipment Distributor demonstrate!

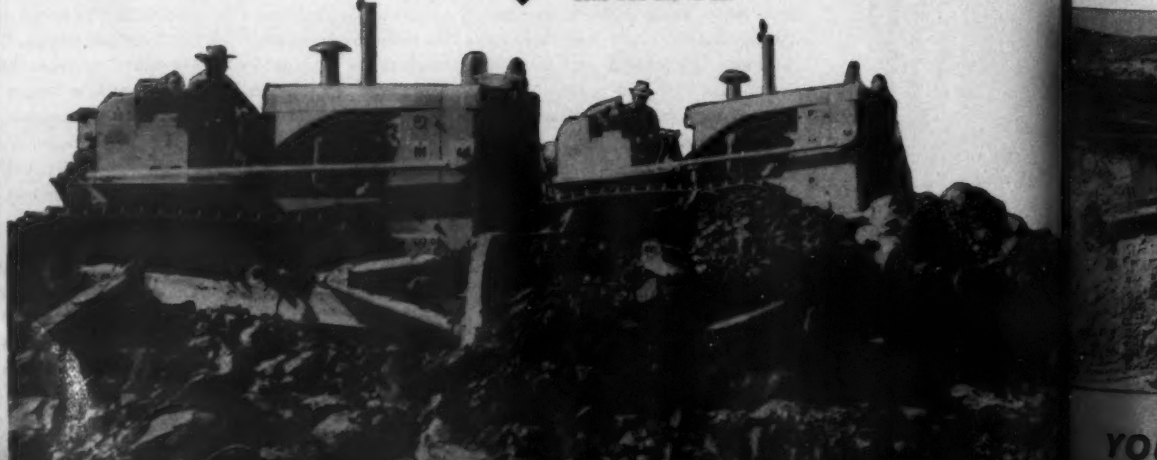


**International
Construction
Equipment**

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Illinois
A COMPLETE POWER PACKAGE

"On course" steering with offset loads means full-capacity production even in rock-laden material. To prevent needless zig-zagging and loss of momentum, a "25" operator simply changes the speed of one track to put extra power leverage where needed to meet changing conditions. These two machines, pioneering a 107-foot deep cut, are members of a fleet of seven International TD-25's on a Kentucky Turnpike job in rocky, hilly terrain.

Pushes of over 600 feet pay off for this New Mexico contractor—producing sub-base gravel for a North Albuquerque highway. Instant speed control of either or both tracks with the planetary transmission means positive load-control—to heap "ripped" gravel and "run" to the crusher hopper. Then the "25" high reverse of 7.5 mph means fast back-up for the next push. What would have been a costly 2-tractor operation is efficiently done with one TD-25!



Closeup of inverted V-shaped steel stud that supports a tension member atop the central service section. The roof in this area is composed of precast triangular-shaped reinforced-concrete shells.

(60 feet). The piles support a shallow continuous foundation of poured-in-place concrete. Columns rising from the grade beams support prestressed-concrete beams across the top of the central section. The roof of this area is made up of triangular-shaped precast reinforced-concrete shells, 3 centimeters (1 1/4 inches) thick. The 3-sided shape of the shells imparts a greater stiffness to this portion of

the roof and provides the proper force transmission from the roofing arches to the bracing.

The long elevations are enclosed by aluminum curtain walls, while the shorter ends have jalousie-type walls. The entire building will be air-conditioned. Floors consist of 1 x 2-meter (3.3 x 6.6-foot) precast-concrete slabs, 8 centimeters (3 1/4 inches) thick.

Prefab framework

Framework for the roof was prefabricated and assembled in sections at the Warsaw steel mill. Thus an arch, with its two halves of ties,

was made up in three parts, none longer than 15 meters (49.2 feet). These sections were also strengthened with stiffeners for hauling to the site. All erection was handled by a truck crane using a transverse beam with a 4-point pickup. The sections were placed on tubular scaffolding and joined by welding.

The designers at first intended to prestress the tension members by anchoring the cables in the edge beams atop the outside columns. They expected to loop the cables around pipe fused into the heads of the stud frames that rise from the central-section roof. Stressing would be done at this point for both sets of cable in line. This method was superseded, however, during erection in favor of the use of a continuous cable and simultaneous stressing at both ends by means of jacks placed on movable scaffolding. The scaffold was moved along the side as tensioning operations were carried out at each pair of opposite columns.

One problem arose in placing the precast-concrete slabs for the mezzanine floor. The slabs obviously could not be placed before the framework of the roof was erected, since the floor would have blocked off the crane. Once the arches were up, however, the crane did not have enough headroom in which to operate, except at the extreme ends, where the vertical clearance was greatest. Accordingly, the crane lifted all slab sections to the ends of the mezzanine where the roof was highest. From there the slabs were shifted by hand to the areas where the roof was lower.

The team of designers on the project included: architects Prof. Jerzy Hryniewicz, who is also a member of the Polish Sejm (parliament), and Matthew and Eva Krasinski; and structural engineers Wacław Zalewski, Andrew Zorawski, and Stanisław Kus.

Super-Sam's design recently won a first-place award in a contest sponsored by SARP—Association of the Architects of Poland.

The design of the market is a project of the Industrial Building Research and Design Bureau of which Jerzy Kawecki is director.

THE END

ers **PROFIT** with
-Glower shifting!



eady full-power traction on both tracks full time assures ample push to beat the grade and handle big loads of tractor-dumped bentonite at an Arizona mine. This TD-25 keeps busy moving overburden, ripping and stockpiling the ore. Only the 5" gives you the power-wallop of the free-breathing, dual-fuel DT-817 diesel—with 230 turbocharged hp. Push-button starting saves operating time—operator effort!

Planetary track speed control lets you turn heavy offset loads or push straight ahead with them—without profit-robbing spillage or time waste. See how this planet-drive "25" beats king-sized clutch-steered crawler capacity with 2-finger ease—overcoming the sidedraft of bulldozing random-dumped dirt and boulders on a Virginia road job. And right where clutch-steered king-sized crawlers waste power and momentum, TD-25's can heap-load scrapers in record time!



Heading the team of designers on the supermarket project are Wacław Zalewski, structural engineer, and Prof. Jerzy Hryniewicz, architect.

For more facts, use Request Card and circle No. 254

YOU EARN WITH WHAT YOU CAN TURN WITH!

The Bookshelf

Print second volume of bituminous reference

ASPHALTS AND ALLIED SUBSTANCES. Vol. 2, Industrial Raw Materials. By Herbert Abraham. 348 pages. Published by D. Van Nostrand Co., Inc., 120 Alexander St., Princeton, N. J. \$10.75.

The second of five volumes, which constitute the sixth edition of a standard reference guide for the bituminous-products industry, covers tars, pitches, pyrogenous asphalts, and waxes. The composition of these substances is analyzed, and the methods of distillation used in their recovery and refinement are given. Material on specific economic uses of products derived from the distilling of asphalts and related materials is included.

ASCE publishes cumulative index

CUMULATIVE INDEX TO ASCE PUBLICATIONS. 308 pages. Published by the American Society of Civil Engineers, 345 E. 47th St., New York 17, N. Y. \$20. (\$10 to public and school libraries.)

This new index lists, by title and author, articles appearing in *Civil Engineering* from October, 1930, through December, 1959; papers in "Transactions" from 1935 through 1959; and papers in "Proceedings" from 1950 through 1959.

PCA bridge bulletin

PRECAST-PRESTRESSED CONCRETE BRIDGES, PART 5—Creep and Shrinkage Studies by A. H. Mattock. Bulletin D46. Published by the Portland Cement Association, Research and Development Laboratories, 5420 Old Orchard Road, Skokie, Ill. Free.

The fifth of a series on precast bridges, this bulletin reports on an investigation of creep of the girders and differential shrinkage between girders and deck slab. Researchers found that restraint moments set up due to creep and shrinkage affect the behavior of girders at service load only, the ultimate strength being unaffected.

Comparative methods in prestressed tank design

PRESTRESSED CONCRETE CYLINDRICAL TANKS by L. E. Greeny. 218 pages. Published by John Wiley & Sons, Inc., 440 Park Ave. S., New York 16, N. Y. \$6.75.

There are many alternative factors to consider when planning a prestressed-concrete cylindrical tank, and this book is designed to simplify those problems and to assist in the design and construction of the most appropriate tank. Special attention is given to the repair and sealing of defects by pressure grouting.

HRB publishes papers on bridges, paving

Bulletin 271, CONCRETE PAVEMENT DESIGN AND PERFORMANCE STUDIES, 1962. 101 pages. \$3.50.
Bulletin 272, BRIDGE DESIGN STUDIES AND PILING TESTS, 85 pages. \$1.80.
Bulletin 280, BITUMINOUS CONSTRUCTION OPERATIONS, 22 pages. 60 cents.
Published by the Highway Research Board, 1201 Constitution Ave. N.W., Washington 25, D. C.

Bulletin 274 reports on portland-cement-concrete experimental projects. It presents results of tests involving performance of continuously-reinforced and nonreinforced

concrete, spacing of joints, corrosion of load-transfer joints, merits of skewed joints, and other pavement design features.

Bulletin 279 contains four papers on: transfer of load between precast bridge slabs; dynamic tests of a 3-span continuous I-beam highway bridge; a rapid method for estimating maximum bending stress in simple-span bridges; and a report on a test-pile program conducted by Kansas and Missouri.

Bulletin 280 contains two reports, one on dust control during construction, one on longitudinal and transverse control for bituminous pavers.

Paving research report on asbestos-asphalt

ASBESTOS ADMIXTURE IN ASPHALT CONCRETE. RR 60-5, prepared by the Bureau of Physical Research, N. Y. State Department of Public Works. Reprinted by Johns-Manville, Asbestos Fiber Division, Manville, N. J. Free.

Research Report 60-5 describes materials and methods, field observations, and laboratory tests used on three test strips of asbestos-asphalt paving on Scajaquada Creek Expressway in New York State.

Plastic design in steel

COMMENTARY ON PLASTIC DESIGN IN STEEL. Manual No. 41, prepared by the Welding Research Council and the American Society of Civil Engineers. 173 pages. Available from ASCE, 345 E. 47th St., New York 17, N. Y. \$7. (\$5.50 to ASCE members.)

This manual documents the applicability of plastic analysis to the de-

sign of structural steel beams and frames. Theoretical considerations involved in the plastic theory and certain secondary design problems are presented.

Field handbook on landslides

LANDSLIDE INVESTIGATIONS by Arnold B. Cicaves. 87 pages. Published by the U. S. Bureau of Public Roads. Order from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. 30 cents.

Prepared primarily for highway location engineers, this illustrated pocket-sized handbook on landslides and related phenomena is of interest to other engineers, too. It covers signs characteristic of slides; methods of prevention, control, and correction; and mapping and reporting slides.



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NOVEMBER

Manual on determining insulation thickness

HOW TO DETERMINE ECONOMIC THICKNESS OF INSULATION. A Study by Union Carbide Chemicals Co. and West Virginia University. 180 pages. Published by the National Insulation Manufacturers Association, 441 Lexington Ave., New York 17, N. Y. \$6.

The manual, in a revised edition subtitled "A manual for specifying insulation for flat surfaces and pipes at elevated temperatures," is now available.

The original manual presented, by the use of charts and tables, a simple 4-step system that could find the economic thickness for a run of pipe in minutes rather than hours, as previously required.

The new edition extends the capital investment charts to cover steam costs from \$2 to \$24 per pound of

steam per hour, and includes an alternate method of using the charts, based on plant depreciation periods. It is possible to select from the 17 graphs and 126 pages of thickness tables the data that apply to a specific condition, once the local cost factors are known.

Offer directory of independent labs

DIRECTORY OF AMERICAN COUNCIL OF INDEPENDENT LABORATORIES, INC. 114 pages. Published by the ACIL, 4302 East-West Highway, Washington 14, D. C. Free.

The eighth edition of a guide to the leading independent testing, research, and inspection laboratories in this country. It is available without charge to executives when requested on company or official letterhead.

Concrete-pavement work covered by HRB papers

Bulletin 265. CONCRETE PAVEMENT CONSTRUCTION. 58 pages. Published by the Highway Research Board, 3101 Constitution Ave., N.W., Washington 25, D. C. \$1.40

Bulletin 265 contains papers on construction practices on cement-treated subgrades for concrete pavements; adjustment of concrete-paving equipment; placing, finishing, and curing concrete pavement; and materials control and batching operations for rigid pavement. A study of 34-E pavers is included.

A paper on cost vs. mixing time on dual-drum paving, by Morgan J. Kilpatrick, chief of the Construction Economy Branch of the U. S. Bureau of Public Roads, claims that savings running into millions of dol-

lars a year could be made by a reduction in the mixing time specified by state highway departments for pavement concrete. According to Kilpatrick, modern mixers and fast dump trucks permit contractors to produce high-quality concrete in much shorter cycles than usually specified; therefore, a reduction in the existing mixing cycles (which now run up to 120 seconds) to 50 seconds would reduce the cost of concrete by \$2.98 per cubic yard, while reduction to 35 seconds would cut the cost by \$3.25 per cubic yard.

Determining influence lines for continuous structures

INFLUENCE LINES FOR PLANE AND THREE-DIMENSIONAL CONTINUOUS STRUCTURES by Samuel Chamecki. 88 pages. Published by Frederick Ungar Publishing Co., 121 E. 23rd St., New York 10, N. Y. \$4.50.

Samuel Chamecki, professor of structural and foundation engineering at the University of Parana, Brazil, has prepared a concise guide for figuring influence lines for statically indeterminate plane and 3-dimensional structures. Results of this rapid method are claimed to be always correct, even if errors have been made in computing. All the coefficients needed for prismatic and nonprismatic members are given in tabular form. The most unfavorable position of a moving load can be partially determined, avoiding calculation of useless ordinates and influence areas.

Nuclear-blast shelters

DESIGN OF STRUCTURES TO RESIST NUCLEAR WEAPONS EFFECTS. Manual No. 18, prepared by the Committee on Structural Dynamics of the ASCE Engineering Mechanics Division. 150 pages. Available from the American Society of Civil Engineers, 345 E. 47th St., New York 17, N. Y. \$4. (\$2 to ASCE members.)

Procedures described in the manual, although based on general principles, are directed to the design of shallow buried shelters, those within 100 feet of ground surface. Protective structures for both personnel and materiel are discussed.

Water-hammer problems is subject of new book

WATER HAMMER IN HYDRAULICS AND WAVE SURGES IN ELECTRICITY by Louis Bergeron. 293 pages. Published by John Wiley & Sons, Inc., 440 Park Ave. S., New York 16, N. Y. \$15.

This translation of the works of Prof. Bergeron, French originator of a graphical method of solving water-hammer problems, has been made under the sponsorship of the American Society of Mechanical Engineers.

This presentation of the graphical method includes its application not only to water-hammer but to electrical and mechanical phenomena as well. Bergeron's method makes it possible to see how the solution is developing step by step with relation to the over-all problem. The results are identical with those obtained by mathematical means. The graphical method may even be more dependable since discontinuous functions of a water column and the variable characteristics of flow of pumping units or of hydraulic turbines can be incorporated simply, and non-linear relationships can be accounted for easily.

CHEVROLET MOVES OUT WITH HIGH TORQUE POWER

THE STUFF THAT WHEELS ARE TURNED BY

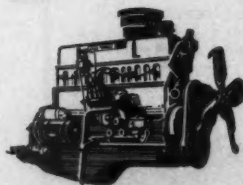
The accent's on torque in a big way for '62, in Chevy's new High Torque power lineup for medium- and heavy-duty trucks. New features, new performance characteristics, and even two brand-new extra-displacement V8's are tailored throughout the line to deliver a heaping hoofful of bulging, bruising torque—to dig in and move out under full capacity loads without a fuss. You'll find Chevy's brand of performance gives you a new kind of mastery over the toughest jobs you tackle, with brute-force breakaway power that just won't take no for an answer. There's no such thing as "no can do" when you're powered up the Chevy High Torque way!

High Torque 261 Six—Standard in Series 60 and 60-H models (GVW's up to 23,000 lbs.). Ideal for hauls that call for load-lugging High Torque power plus proved 6-cylinder economy. Delivers 235 ft.-lbs. of torque and 150 hp to handle maximum loads with low-cost efficiency. This engine backs up your bank account with brute strength to spare—with a forged steel crankshaft, high-alloy inlet valves, hard-faced exhaust valves with Rotocolls and much more.

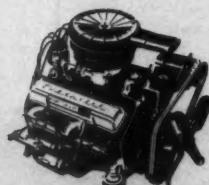
High Torque 327 V8—Optional at extra cost in Series 60 and 60-H (GVW's up to 23,000 lbs.). It's Chevy's newest and biggest medium-duty engine, ready to turn to with 305 ft.-lbs. of hard-pulling torque and 185 hp to tame your toughest jobs. Efficiency stays up, operating costs stay low with top-quality features like these: fuel-metering Power-Jet carburetor, durable precision bearings, aluminum inlet valves, hard-faced exhaust valves and full-flow oil filter.

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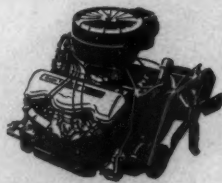
High Torque 409 V8—Optional in Series 80 models (18,500- to 25,000-lb. GVW range). It's the biggest, pullingest engine that ever powered a Chevy heavyweight. With a whopping 252 hp and 390 ft.-lbs. of torque, the High Torque 409 V8 is made to order for extra rugged runs. Long life and trouble-free performance are sure things, thanks to such special heavy-duty features as induction-hardened valve seats, forged steel crankshaft, new 4-barrel carburetor, to mention just a few. (For all the details on High Torque power for your job, see your Chevy dealer.)... Chevrolet Division of General Motors, Detroit 2, Michigan.



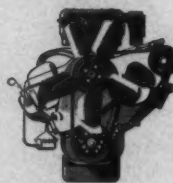
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High Torque 327 V8



High Torque 348 V8



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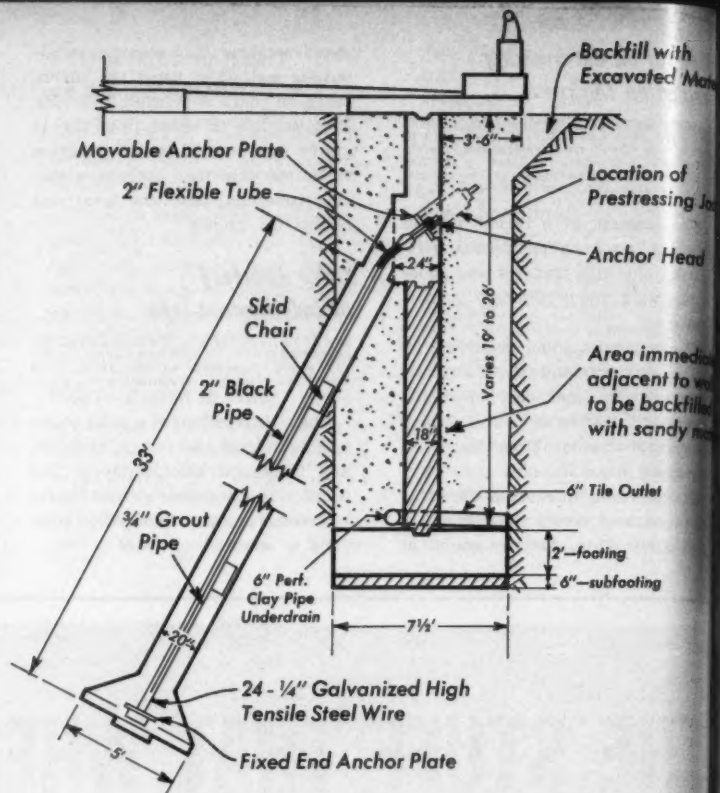
1962 CHEVROLET JOBMMASTER TRUCKS



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Sloping caissons that will be post-tensioned for tying back a retaining wall on a Detroit expressway are drilled 20 inches in diameter by a Williams rig.



Post-tensioned caissons tie back retaining wall

by BILL ALLEN, field editor



A retaining wall tied back with post-tensioned concrete caissons is an unusual feature of a Detroit expressway project.

In order to drill and tie in the caissons, the wall must be built in two lifts. After the lower lift has been completed, the sloping belled caissons are drilled and concrete is placed. Tricky forming joins the tops of the caissons to the upper wall. Strong post-tensioning units take up the strain.

To further complicate the construction, the contractor must build the wall within the confines of a 7½-foot-wide trench. Steel sheet piling holds back the sides of the trench.

And to make the situation more restrictive, there's traffic. Some 80,000 cars roar past the job daily as the equipment moves carefully within a narrow 43-foot work strip.

Garavaglia's contract

At the time the project was visited by CONTRACTORS AND ENGINEERS, work on the contract held by Louls Garavaglia—one of the three contractors working on retaining walls and service roads—was in full swing.

One of the first steps in the construction of the retaining wall is to drive the two rows of sheet piling. Spaced 7½ feet apart, the rows are made up of 22 to 27-foot MP115 22-pound piles. The L. R. Foster Co. furnished sufficient piles to the contractor to line about one mile of trench at a time.

To reduce driving time, the piles are first set in a narrow 6-foot-deep trench. The trench, which is 3

A bell bucket on the Williams drill rig makes the 5-foot-diameter bell. Sheet piles sticking up in the air have been pulled to make room for caissons. The top 6 to 8 feet of the caisson is in sandy backfill material; this portion is encased.

CONTRACTORS AND ENGINEERS

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Two 55-gallon drums, welded together, make an inexpensive casing for the top part of the caisson, which is in sandy backfill; the lower part is in stiff clay. Concrete is around the Stressteel 1½-inch rod in flexible tubing, which goes to the bottom of the casing. The grout pipe goes to the bottom of the post-tensioning rod.



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After the upper section of the retaining wall is completed, a portable jacking unit puts 87½ tons of force on the steel rod to stretch it 1½ inches. Jacking equipment is furnished to the job by Stressteel.

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GINEERS

THE INSIDE AND OUTSIDE

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Max. End Reaction	3,600 lbs.	Max. reach	(from center of track) 89' 11"
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Adjustable Length	6' 1" to 10' 6"	Max. sheave height	215' 6"
Max. Bending Moment	3,620 ft./lbs.	Capacity range	3,190 to 18,700 lbs.
Max. End Reaction	1,760 lbs.	Hoisting winch	60 h.p.
Weight	48 lbs.	Model 821	
VERTICAL SHORE		Max. tower height	(at jib pivot point) 158' 2"
Adjustable from	8' to 11'	Max. jib length	138' 4"
Capacity from	4,000 to 10,000 lbs.	Max. reach	(from center of track) 144' 1"
		Max. sheave height	291' 7"
		Capacity range	4,400 to 23,100 lbs.
		Hoisting winch	60 h.p.

24-1



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inches wide, is dug by an Auburn trencher mounted on the rear of a Work Bull 202 tractor. After the trench is dug, a heavy H-beam is set along one side to guide the sheet pile. A Lorain 820 crane then sets the individual piles in the trench.

After one crew "sticks" the piles, another crew follows close behind with driving equipment. A Link-Belt 520 diesel hammer knocks the piles down two at a time to a depth of about 3 feet below the grade of the footing. The diesel hammer is particularly suitable for working in the confined space, since it requires no compressor or boiler.

With both walls of sheeting driven, a Northwest Model 6 backhoe moves in to excavate the trench. Generally, the material is a stiff cohesive clay, although in places the upper layer is sandy. The backhoe swings the material to waiting dump trucks.

Fine-grading the bottom of the trench is accomplished by a Caterpillar D2 dozer. Working between the walls of sheet piling, the rig moves the bladed

material up to where it can be scooped out by the backhoe.

As the excavation proceeds, the wall is braced by one row of heavy timber wales. The 20-foot-long hardwood timbers are cross-braced by 6 x 8 struts at about 10-foot centers.

The first concrete to go in the trench is a 6-inch nonreinforced subfooting. On this thin slab is poured a 2-foot-thick reinforced-concrete footing. No forms are required for the footings, since the concrete is placed against the sheet pile. Concrete for this operation, as well as others to follow, is placed by transit-mix trucks.

Rising from the footing is the lower lift of the retaining wall. It is 18 inches thick and varies in height from 8 to 15 feet. To form the wall, men must work in the narrow trench beneath the timber cross bracing, which is slightly above the top of the lower lift of the wall.

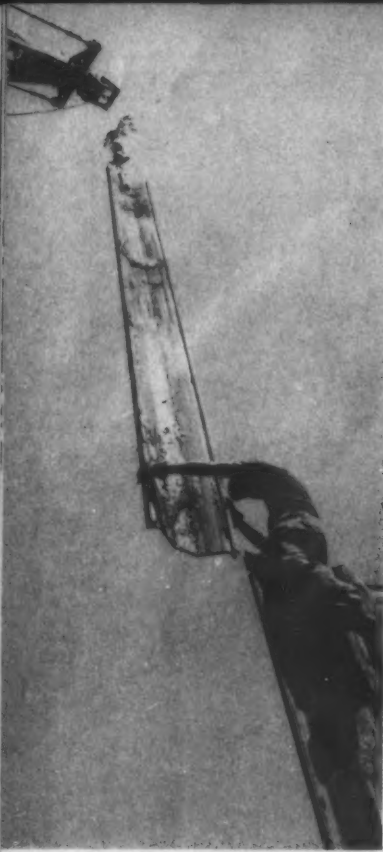
Forming of the wall is speeded by ganging the

Symons panels in 18-foot-long sections. At times, the ganged forms are moved forward by rolling them on small steel dollies. The only difficulty in this setup is the occasional steps in the footing. These make it necessary to lift the forms. When the forms are not rolled forward, they are lifted out, moved by truck, and placed again by crane. Intermediate cross braces must be removed before the form can be lifted from the trench. The wall is formed in a skip-and-fill-in pattern in about 34-foot sections.

Drilling caissons

With the lower wall completed and backfilled, work starts on the concrete caissons. The 20-inch-diameter caissons are 33 feet long with a 5-foot bell. Depending on the height of the wall, their spacing varies from 12 to 18 feet. Each caisson is on a slope that drops 2 feet for every 1 foot of horizontal distance.

Before the caissons can be drilled, two and some-



A workman astride the Foster sheet piles guides a pile held by a Lorain 820 crane into the groove of an adjoining pile.



Sheet piles are guided into the starting trench by an H-beam template. The two rows of piles are driven 7½ feet apart to support the walls of the trench.

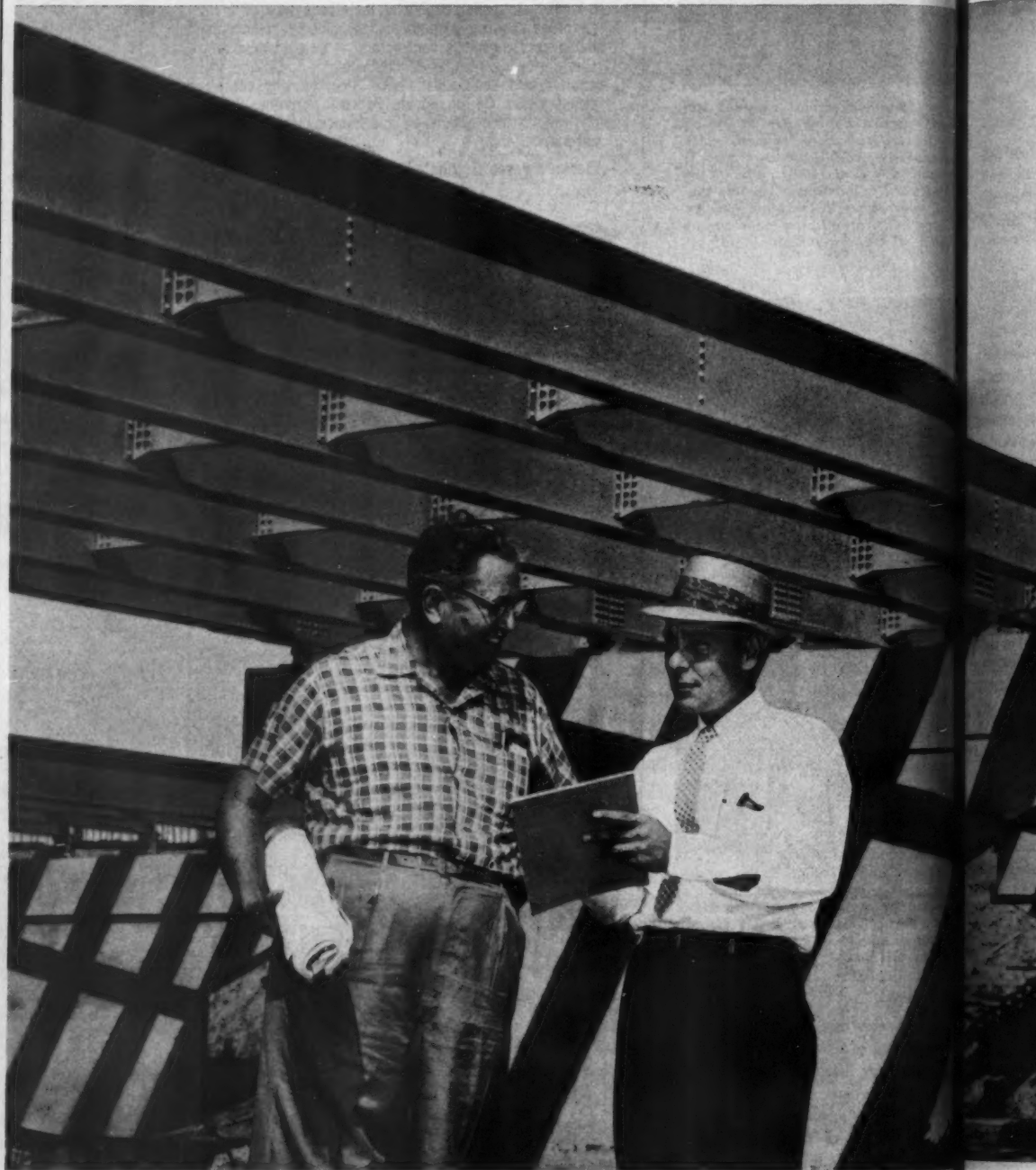


(Continued from preceding page)

times three sheet piles must be partially pulled to make way for the hole. A Williams truck-mounted drill then moves the line augering out the slanting holes. Generally, the material is a stiff clay, and there is seldom need for temporary casing. A special bell bucket with expandable sides drills the bells.

Since the top 6 or 8 feet of the

A diesel hammer handled by a Lorain 820 drives the sheet piles, two at a time, some 3 feet below the bottom of the trench.



An important Rieth-Riley project is the construction near Indianapolis of five bridges at the intersection of U.S. 52, Interstate 465 and Bypass 100. Here Miles Shookman checks service and delivery requirements with bridge superintendent H. P. Kunkler.



BY MILES SHOOKMAN
About the Author. Operating out of Indianapolis, Miles Shookman has the job of providing specialized service to construction contractors in his territory. A graduate of Indiana University, Miles is well qualified for this important assignment. He has been doing this work for much of the 15 years he's been with the company, and also at-

tended the Company's Sales Engineering School.

★ ★ ★

Rieth-Riley Construction Company, Inc., is a large, highly diversified contracting firm with headquarters in Goshen, Indiana. As "Contractor Representative" for American Oil Company, I work closely with Rieth-Riley to provide the specialized service needed for construction operations. This means visiting widely scattered

projects to make sure the company gets the right product in the right place at the right time—always. Specializing in highway, bridge and street projects, Rieth-Riley owns and operates a large number of complicated and expensive pieces of equipment. Years of experience has taught the importance of uniform maintenance practices and consolidated fuel and lubrication programs. That's why Rieth-Riley depends on American Oil

No matter what the need, oil is an American product. As for service—example—is serving contractors with the best advice and help. For the same reason, the American

caisson is in the sandy material of the backfill of the lower wall, this portion of the hole is encased. Garavaglia saves money by using 55-gallon drums for the casing. With the ends cut out, two drums are welded together to form the casing.

After the caissons are drilled and the upper casing is in place, the post-tensioning units are lowered into the hole. Made by Stressteel Corp., the 1½-inch steel bars are encased in a flexible tubing of slightly larger diameter. Extending for the length of the hole, the unit terminates in a heavy steel anchor block. A ½-inch

grout pipe runs from the top of the unit to the bottom of the flexible tubing. Skid chairs, attached to the unit at several points, keep the tensioning bar positioned at the center of the hole.

Transit-mix trucks chute concrete through an elephant trunk to fill up the caisson. Electric vibrators are lowered into the hole to consolidate the concrete. After the concrete is partially set up, four No. 11 dowel bars are thrust about 4 feet into the concrete. This is the only reinforcing in the caisson.

With concrete placed for the cais-

sons, carpenters start forming the upper lift of the wall. This is complicated by the irregular shape of the back of the wall. It jogs out 6 inches to accommodate a continuous beam that ties in with the caissons. Odd-sized forms must be built to make the tie between the top of the caisson and the wall. A special block-out is necessary to fit the anchor plates at the point where the tensioning rod pierces the outside face of the wall.

The 7 and sometimes 9-foot-high upper wall is formed with Symons steel-backed plywood form panels.

(Continued on next page)



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Working close behind the backhoe, a Cat D2 fine-grades the bottom of the trench. It blades to the backhoe, which picks out the excess.



The lower lift of wall rises from a 2-foot-thick footing. A completed lower lift is in the foreground. Only one row of wales is needed to brace the 20-foot-deep trench; cross struts are about 10 feet apart.



An Auburn trencher, mounted on the back of a Work Bull 202, digs an 8-inch-wide 6-foot-deep trench for starting the sheet piles. This saves driving time and cuts down noise in the work area.



An 18 x 12-foot section of ganged Symons form panels for the lower wall is handled by a Lorain crane that makes a pickup from a special steel rack on the bed of a Ford truck. The rack holds four forms with bracing.

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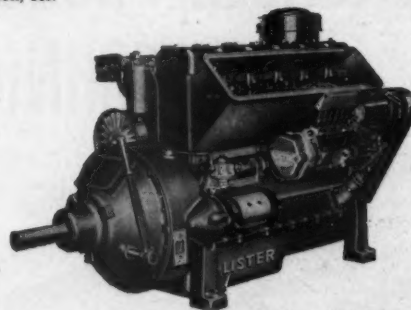
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(Continued from preceding page)

These can be ganged in 18-foot sections for the outer face of the wall, but for the irregular inner face the panels are set in place individually.

Tensioning

After the concrete of the upper wall reaches a compressive strength of 2,400 psi, the steel rods are tensioned. With an electric-powered portable hydraulic jack, each rod is pulled with a force of 87½ tons. The force stretches the 35-foot-long rod about 1½ inches. A conical wedge, bearing on the anchor plate, holds the tension in the rod. After tensioning, the grout pipe and flexible tubing are flushed with water and then pressure-grouted with a mixture of sand, cement, and water.

With the sheet piles pulled and the wall backfilled, the cantilevered section of the wall is built. About 2 feet of this slab rests on the inside fill. 3½ feet overhangs the expressway. On the outer edge of the cantilevered slab is a 12-inch curb. On the curb rests an 18-inch parapet wall topped by an aluminum guardrail.

Before construction started on the wall, engineers of the Michigan State Highway Department performed full-scale pull-out tests to demonstrate the effectiveness of the belled caisson tie-backs. The results determined the most economical length of caisson for the variable height of wall and soil conditions. The tests further revealed that each of the 20-inch belled caissons is good for a design load of 150,000 pounds.

In the test caisson, reinforcing cages were used instead of post-tensioning units. In the actual construction, post-tensioning units were specified for convenience in handling.

Burt Stover is superintendent for Garavaglia. Barney Milroy superintends the work for Darin & Armstrong, and Dick Wells is superintendent for the joint venture.

The construction is under the supervision of the Redford District office of the Michigan State Highway Department. Frank Skebensky is district road engineer. Project engineers on the job are John Wisniewski, Paul Daavettilla, and Adam Syptkowski.

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NOVEMBER

The big squeeze for the expressway extension in Detroit . . .

The 5-mile extension of the John C. Lodge Expressway along the existing route of the James Couzens Highway in Detroit will be depressed expressway, with two 36-foot lanes, two 30-foot service roads, and occasional access ramps squeezed within an existing 204-foot right-of-way. This means vertical walls for the expressway and a 3½-foot cantilevered section to provide width for the service roads.

Since there is no feasible detour for the heavy traffic, it must move over the Couzens highway while the expressway is being built. To keep both traffic and construction moving at the same time and the same place, a temporary 3-lane concrete roadway must be built in the median strip. An involved schedule must be worked out.

In the stage construction, the temporary 3-lane roadway in the median is built first. This carries one-way traffic until the service roads

and retaining walls are built. One of the two existing 40-foot pavements on Couzens carries traffic in the opposite direction. The contractor first builds the retaining wall and service road on one side of the expressway. After traffic is routed to this service road, the contractor moves his equipment to the other side of the expressway and commences building the retaining wall and service road. Finally, when traffic is able to flow on both service roads, the temporary 3-lane pavement is torn up and excavation commences for the expressway lanes.

Construction, which is supervised by the Michigan State Highway Department, began in the fall of 1960 with the paving of the 33-foot-wide concrete roadway in the median strip.

With the completion of the temporary route, three contracts were let in close succession for the construction of retaining walls and service

roads on both sides of the entire route.

Louis Garavaglia, Contractors, Inc., Warren, Mich., was awarded the contract for the next 1.4 miles for a price of \$4.3 million. Work includes building the retaining wall and service road on each side of the expressway.

Adjoining this work is a 1-mile stretch awarded to a joint venture of Walter Toebe & Co., Lansing, Mich., and C. A. Hull Co., Inc., Birmingham, Mich. The \$2.7 million contract for retaining walls and service roads is scheduled for a May, 1962, completion.

Work methods are similar on all three contracts, although there are some minor variations. Two of the contractors prefer patented wall forms, while the third builds his own plywood forms. Two of the contractors tension the caissons with heavy steel-bar units. The third uses a group of small-diameter wires.

Steel work starts on span over the Narrows

The first large steel section for what is to be the world's longest suspension bridge was set in place last month in New York harbor. A 47-ton tier section was placed on foundations for the western tower of the Verrazano-Narrows Bridge.

Bethlehem Steel ironworkers will raise about 27,000 tons of steel and install some 1 million high-strength bolts in constructing the tower.

The 12-lane double-decker bridge will have a center of 4,260 feet, 60 feet longer than that of the Golden Gate Bridge. It is to be completed in 1965 at a cost of \$325 million.

Heavy-construction and building equipment added to CIMA '63 Road Show

The 1963 Construction Equipment Exposition and Road Show to be held in Chicago is being expanded to include equipment used by building and heavy-construction contractors.

The Construction Industry Manufacturers Association, sponsor of the show, has added Duane Cronk of the Highway Information Service to its publicity committee. He will work with the committee's head, Donald V. Buttenheim, president of Buttenheim Publishing Corp., and with Harvey A. Scribner, president of Russell T. Gray, Inc., Chicago advertising firm.

Grant awarded for study of bituminous concrete

Edward M. Krokosky has been awarded a \$4,500 fellowship for the study of bituminous concrete by the National Bituminous Concrete Association. The research will be the basis of his doctor's thesis at Massachusetts Institute of Technology, where he is a civil engineering graduate student.

Krokosky will try to discover how different loading rates deform bituminous concrete at different temperatures, and how the material recovers from these deformations. His work is expected to lead to new measurement techniques that will enable paving engineers to predict how specific bituminous-concrete surfaces will stand up under varying conditions.



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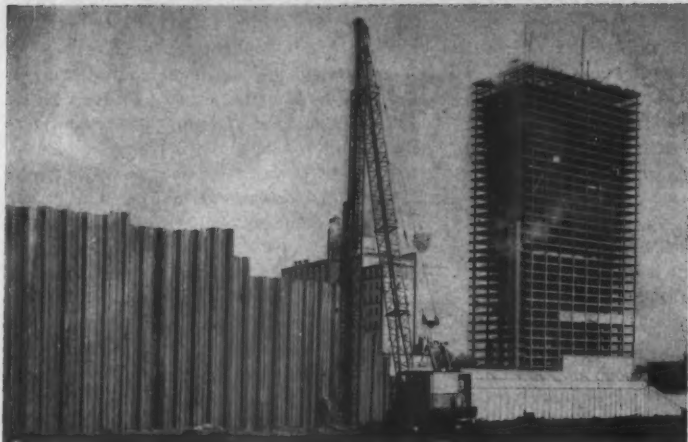
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A Lima 44 crane with an 85-foot boom supports specially designed contractor-built telescoping leads that guide a Delmag D 22 diesel hammer as it drives L. B. Foster sheet piles through clay and rock around the site of a new building in Houston.

Steel-sheet piling takes tough driving

A 2-foot-thick tight mixture of clay and rock located 27 feet below street level made the driving of steel-sheet piling around the site of a 21-story building in Houston's \$100 million Cullen Center complex an extremely tough proposition. It took a giant hammer working at full capability to do the job.

Piling subcontractor J. G. McCulloh Construction Co., Houston,

Texas, had the job of pushing about 11,000 square feet of MZ-38 and 20,000 square feet of MZ-27 steel piling through the stratum and around the 132 x 270-foot building site.

Steel-sheet piles, rented from L. B. Foster Co.'s Houston office, were shipped to the site in 41-foot lengths and driven full depth by two Lima 44 cranes with 80 and 85-foot booms.

To align and set the piling, the contractor drove sheets between two parallel 12 x 12-inch timber guide wales that were pinned to the ground and bolted to previously driven sheets. After 40 linear feet of sheet piling was set, the guides were unbolted and moved forward.

One crane was used to set sheet piles and tack them with a steel "hairpin." After 80 linear feet of wall was set, a second Lima was brought in to handle final driving.

To provide maximum control of pile driving, McCulloh designed and built 2-foot-square girder leads, about 60 feet long on the Lima with the 85-foot boom, suspended from the crane cable and telescoped around a 14-inch-diameter 25-foot-long spiral-welded pipe pinned to the top of the boom. This pipe stabilized lateral movement of the leads during driving. A Delmag D 23 diesel hammer—the largest made—with a 39,700-foot-pound blow rode the special leads.

In pile driving, the crane operator first raised the leads, together with the hammer, around the stabilizing pipe. The crane then moved wherever needed. To start driving, it was positioned in front of previously set sheet piles; the hammer was lowered slowly until it rested on top of the two sheets that were to be driven simultaneously; the base of the leads was lowered to the ground. Driving then began.

Bottom support of the leads was obtained by resting them on the ground, while alignment at the top came from the pipe pinned to the boom. This provided all the lateral stability necessary. These free-swinging leads made moving around the site, as well as positioning the pile driver, a very fast operation.

Normal driving with the powerful Delmags averaged 1-inch penetration to approximately 16 blows. To drive a pair of sheets simultaneously, McCulloh cable-hung and bolted a 4-inch-thick steel driving head to the base of the hammer to spread the force of the blows.

The slow hammering through the 2-foot stratum averaged 1/4-inch penetration per 250 blows. (It was during this phase that the contractor discovered that the 6-inch-thick driving head splitting under the tremendous impact and substituted the 10-inch head.) Driving was particularly difficult by a wellpoint.

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NOVEMBER,



Supported by steel stirrups, a worker guides a 41-foot-long Foster sheet pile into interlock. Piles were later driven full depth, two at a time.

system that had been installed around the entire site to draw down the ground water table from 17 to 45 feet below the surface.

After the piling was installed, W. S. Bellows Construction Co., Houston, the building's general contractor, expanded its foundation excavation operations to the piling, and installed wales and raker bracing as concrete spread footings were placed.

Research program under polar ice cap

U. S. builders will reap rewards from a U. S. Army research program being conducted more than 20 feet under Greenland's polar ice cap. The project, dubbed Camp Century, is proving the winter worth of several products, among them prefab panels, adhesives, and glass-fiber insulation.

The Panel Corp. of America, Danbury, Conn., which built five of the buildings, had a special problem with insulation because heat loss could cause the snow to melt. For core insulation in the roofs and walls, the company used a 2-inch-thick insulation composed of long, textile-type glass fibers called Ultralite and made by Gustin-Bacon Mfg. Co. of Kansas City.

The building panels consist of aluminum skins bonded to an asbestos honeycomb core with a synthetic rubber-resin adhesive, D-288, made by Armstrong Cork Co., of Lancaster, Pa. Light weight, as well as strength, was required because the panels had to be erected by hand inside the snow tunnels. Construction of the panels was facilitated by the adhesive, which is designed to bond firmly and permanently; withstand below-freezing temperatures; and resist tensile stress.

The buildings were erected at the Panel Corp. plant to make sure the panels fitted perfectly, then were disassembled, packed in crates, and shipped to Greenland where they had to be hauled nearly 100 miles by snow-tractor over rough ice to reach the construction site.

TRAVELING FROM SHOVEL TO CRUSHER near Kyle, Texas, where H. B. Zachary, Inc., San Antonio, is providing 700,000 tons of rock aggregate for an 11-mile stretch of Interstate 35, is this International Model 65 Payhauler.

An empty companion unit (top) makes the return trip. The trucks are part of a 4-unit fleet dumping 500 tons of rock an hour into the crusher. Distance from shovel to crusher is 1,000 yards. Cycle time is five minutes.



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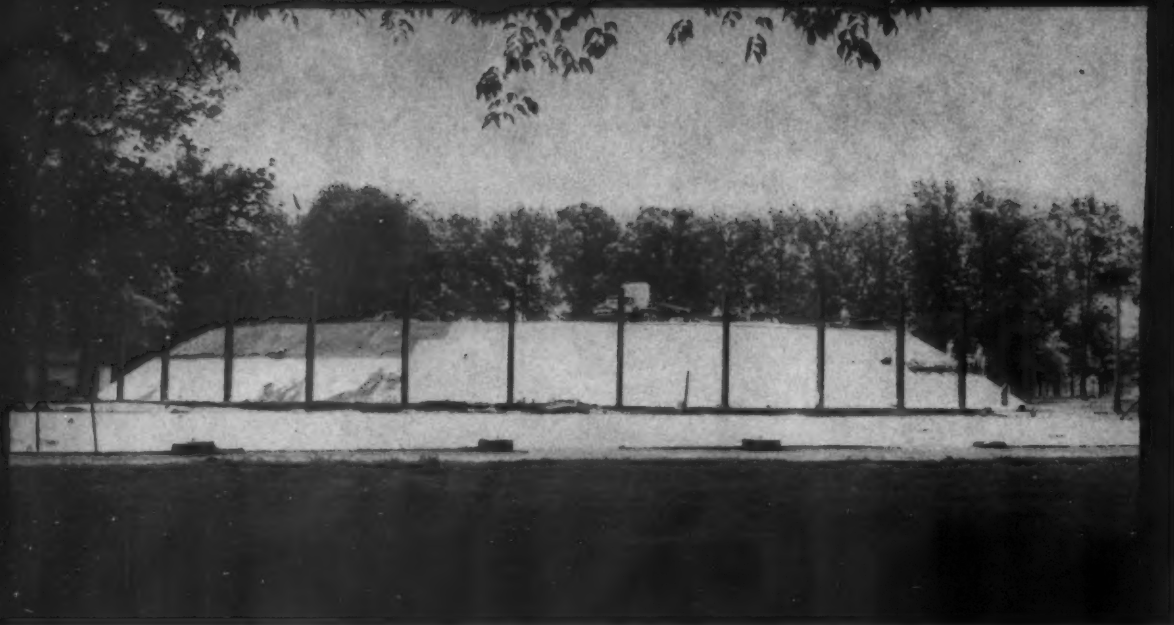
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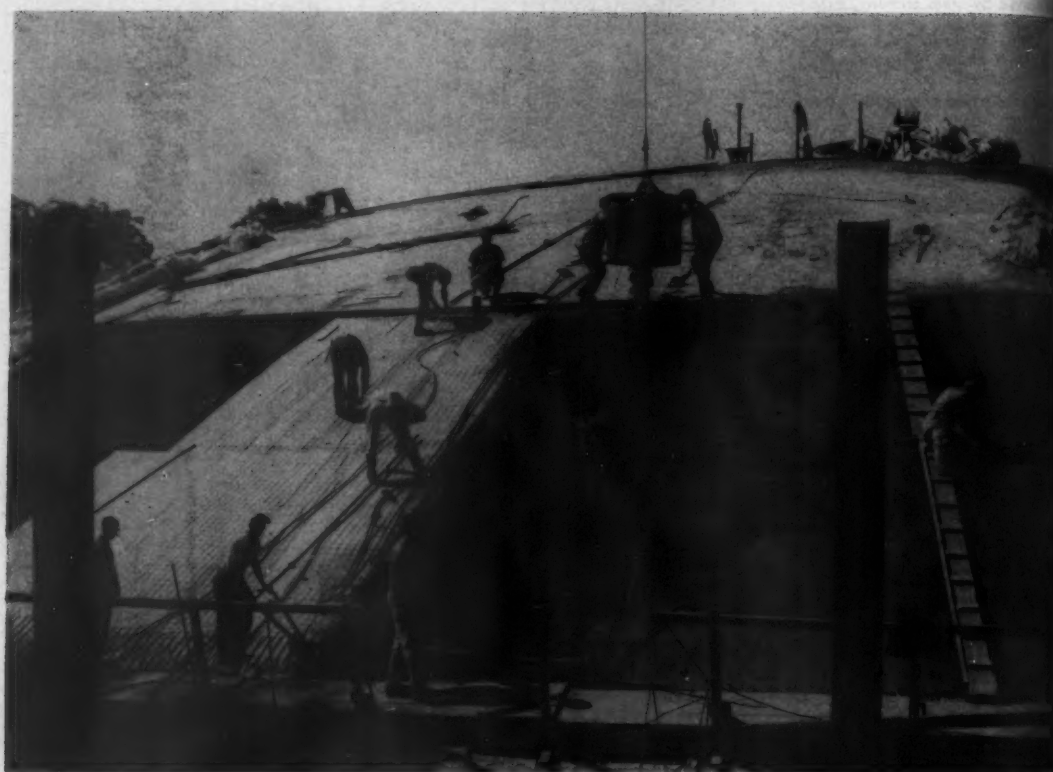
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Holding to a cost of \$3.16 per square foot, a contractor is building a 244-foot-diameter lightweight concrete dome for an auditorium for the Church of God in Anderson, Ind. Trucked-in gravel, built up in layers and covered with Styrofoam, is used as a form.



A 2-man screed guide is pulled by tractor to screed and to fit the



A Case 310 loader pulls the screed that levels the fine gravel base. Both the wood screed and the wood screed bars it rides are curved to fit the radius of the dome. The 14-inch H-beam columns are set in blockouts at the inner edge of the ring beam.

Combination method slashes cost

A mound of gravel, foam plastic and Lift-Slab method keep price low

Some of the concrete structure is built together. To build the dome, they came up with a ring of concrete. They are dome on a building the ing it up in up, a ring transit-mix

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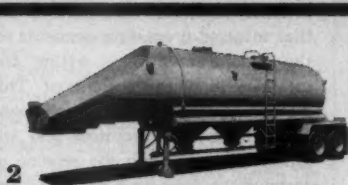
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A 2-man plow-handle vibrating screed guided by pipe screed bars is pulled up the slope by the Case tractor to strike off the concrete. Screed and screed bars are curved to fit the dome.



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Methods dome

Some ingenious building techniques were put together to produce a low-cost long-span concrete dome. The cost of the 244-foot-diameter structure is only \$3.16 per square foot.

To build the dome at this price, a youthful architect and an engineer put their heads together and came up with some unusual cost-saving ideas.

They are saving on forming costs by casting the dome on a mound of hauled-in gravel. Instead of building the mound all at one time, they are building it up in layers. When a layer of gravel is built up, a ring of concrete is placed around it. The transit-mix trucks are able to drive onto the mound

and chute the concrete directly to the forms. No cranes are needed.

Concrete is placed on Styrofoam planks resting on the graded sand. The foam plastic not only serves as a form, it becomes a permanent part of the insulation on the underside of the dome.

Lightweight concrete is used in the dome, and the reduced weight allows for the design of a thinner shell with less steel.

To save on reinforcing steel in the ring beam surrounding the base of the dome, the strain is taken up with post-tensioning units set inside the concrete.

The amount of hauled-in gravel is held down and the operation simplified by lifting the dome about 16 feet to its final position on the steel column tops. This is done by standard Lift-Slab techniques.

These money-saving methods of construction are being put into practice on the Warner Auditorium in Anderson, Ind. Johnson, Ritchhart & Associates of that city has designed the building for the ex-

ecutive council of the Church of God. Members of the denomination will attend their annual convention in the 7,200-seat auditorium. Lewis Construction Co., a local contractor, has agreed to build the dome for \$178,800. This represents the cost of the dome, columns, and foundations. The cost of the completed building will be about \$400,000. The \$3.16-per-square-foot cost is derived from the \$178,800 figure and an enlarged diameter of 268 feet. The larger diameter includes a 12-foot cantilevered section that extends outside the ring of supporting columns.

Since low cost was a primary objective, Jim Johnson, the architect, investigated many different types of structures and different methods of forming the concrete before deciding on the final design. A steel-truss roof, a geodesic dome, and laminated wood arches lost out in the struggle to keep the price within the means of the owner.

In looking into the possibilities of concrete, the

(Continued on next page)



The 4,000-psi concrete with a ¾-inch maximum-size aggregate and 2-inch slump is chuted atop the Styrofoam plastic. At the end of the chute is Chet Lewis, mud-boot president of Lewis Construction Co.

(Continued from preceding page)

architect was surprised at the high cost of scaffolding that would be needed to form the dome. One estimate using tubular scaffolding totaled \$260,000 (\$82,000 above the price making use of a mound of dirt). Another company submitted a bid that involved precasting segments on the ground and then setting the members in place on the roof. This method also proved to be too expensive. Finally, the architect and engineer came up with the scheme of forming the dome on a mound of dirt that was trucked to the job.

To the architect's knowledge, this is the first dome that has ever been formed on trucked-in material, and then lifted into position. (Concrete domes have been formed on natural ground, and the dirt later removed.) The dome in Anderson is believed to be the largest of its kind in the world.

Thirty-six steel columns, equally spaced on a 244-foot-diameter circle, support the spherical dome. The 14-inch 87-pound wide-flange beams rise from individual concrete footings to tie in with the 25 x 44-inch ring beam containing the post-tensioning units.

From the ring beam, the concrete shell rises 40 feet to a 15-foot-diameter compression ring at the top of the dome. This open hole is later covered with steel framing for exhaust fumes and folded-plate-type roof. The thickness of the dome varies from 10½ inches at its base to a normal thickness of 4 inches. The bottom 18 feet of the shell is reinforced by two layers of No. 5 and No. 6 bars. Above this level, 4 x 4 x 6 mesh reinforces the lightweight concrete.

Office wings of folded-plate-roof design radiate out from one side of the dome. The 1-story wings are planned for future construction.

Construction started with the excavation of a wide 10-foot-deep trench on the column line. The excavated material of the trench for the column footings was unloaded within the dome area to start the mound.

After forming and placing concrete for the 7 x 7-foot, 20-inch-deep footings, crews bolted the steel columns and grouted them into position. Using wood forms, men formed up the ring beam that circles the base of the dome on the column line. The forms were supported by two I-beams spanning the distance between the footings.

Tensioning units in ring beam

Steel lifting collars are formed in the concrete at each column. In addition to a light network of reinforcing steel, the ring beam contains three layers of 2½-inch flexible conduit. Inside each conduit are 40 wires

of ¼-inch cable to rise continuously for 202-foot circumference which lap emerge from points every 10 feet. The three other, are twelve 202 tendons in filled with Joseph T. cago, furn with techn plication.

Some 30 run gravel nearby pit dirt is not rowed and Johnson s



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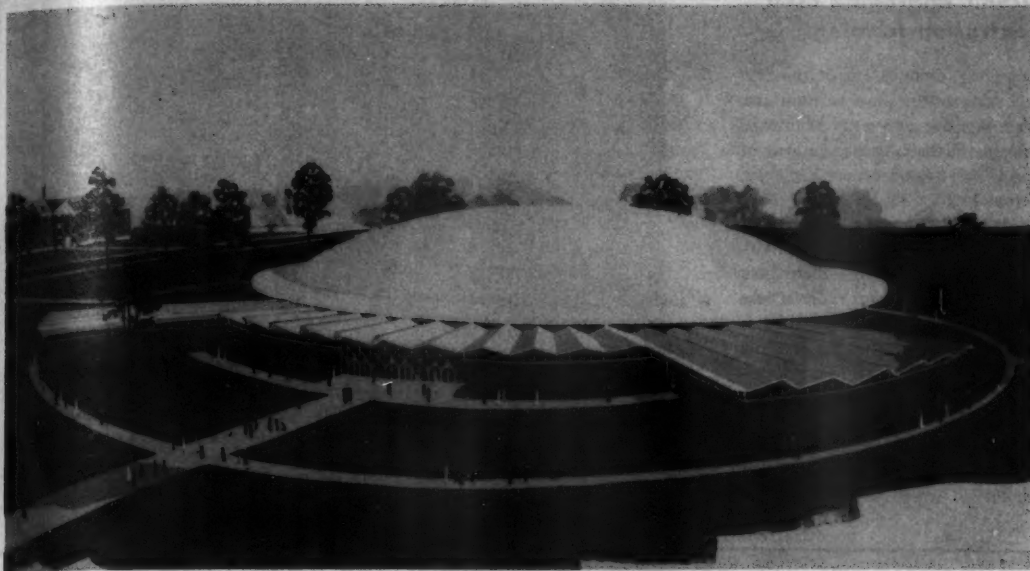
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The architect's rendering of the auditorium for the general ministerial assembly of the Church of God, Anderson, Ind., shows how the folded-plate roof for the office wings radiates out from the 244-foot concrete dome.

of $\frac{1}{4}$ -inch steel. Since it is not possible to ring the dome with one continuous post-tensioning unit, four 202-foot tendons make up the circumference. The ends of the tendons, which lap each other by 8 feet, emerge from the concrete at anchor points every 90 degrees of perimeter. The three layers, set one above the other, are made up of a total of twelve 202-foot tendons. With the tendons in position, the forms are filled with standard-weight concrete. Joseph T. Ryerson & Son, Inc., Chicago, furnished the tendons, along with technical assistance on the application.

Borrowed gravel

Some 30,000 cubic yards of bank-run gravel are trucked in from a nearby pit to build the mound. The dirt is not bought; it is merely borrowed and will be returned. As Jim Johnson says, "This form is dirt

cheap. Renting scaffolding for a quarter of the dome would have cost \$60,000."

The trucks climb a single ramp to dump the gravel for the individual lifts. The lifts go up in about 16-foot intervals measured on the variable slope of the dome. An International TD-9 tractor with a Drott 4-in-1 bucket levels the material. Sufficient compaction is gained by the travel of the heavy equipment.

After the first lift of gravel is placed, men start fine-grading the slopes to receive a 16-foot-wide ring of concrete. A damp unwashed sand, rather than a coarse gravel, is used on the face of the slope. This is fine-graded by several passes of a wood screed pulled by a Case 310 tractor. The screed, as well as the wood guides, are curved to fit the shape of the dome. Control for setting the wood guides is obtained by measuring up and out from the steel columns.

With the slope fine-graded, the 2×8 -foot \times 1-inch-thick planks of Dow Styrofoam are laid side by side on the sand. Occasionally, the planks have to be cut to fit the converging shape of the dome. The reinforcing mesh is then placed on top of the foam plastic.

Lightweight concrete

Concrete is placed in sections of variable length. The men generally place as much concrete as can be conveniently finished in a working day. On a record day, they placed 160 feet. The work is not leapfrogged. Placement is made consecutively, working around the perimeter of the dome. One section is left out of each ring for access of equipment. The gap is later concreted by progressing from top to bottom.

Transit-mix trucks atop the mound chute the concrete to the forms. A

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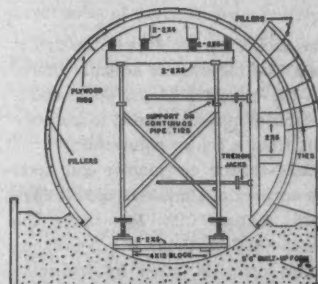
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Cross section showing construction features of jumbo form. Workmen, with a block and tackle manually pulled the "jumbo" 30 ft ahead for the next pour.

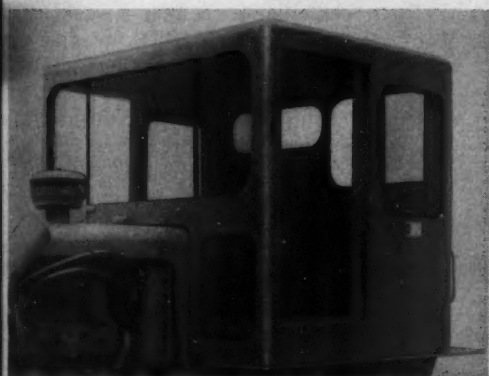
and rode on plank rails. Each section was 32' long and was constructed with 12 inch by 8 foot Symons steel-ply fillers. Workmen were able to strip, move a section 30 feet and re-position in one hour. Symons new gang-form bolt simplified assembling and stripping by allowing the ties to be broken back before moving the sections.

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vibrating screed, shaped to fit the curve of the dome, strikes off the concrete. Two men handle the screed, which is pulled up the slope by a line from a tractor. The screed rides on pipes that are bowed to the approximate curvature of the dome. The concrete is finished with wood trowels and cured with liquid curing compound.

The lightweight concrete of the dome contains $6\frac{1}{2}$ sacks of cement per cubic yard, yielding a 28-day strength of 4,000 psi. The expanded-shale aggregate, Haydite, has a maximum size of $\frac{3}{8}$ inch. Placed with a 2-inch slump, the mix contains 7 to 8 per cent air entrainment.

With all the concrete neatly in place on the mound, post-tensioning of the ring beam commences. Some 720,000 pounds of force is required to resist the outward thrust of the dome. Working in a balanced sequence, each 202-foot-long tendon is tensioned by jacking from both ends. The Swiss BBRV system of holding

Volcanic aggregate used in extrusion forming

Aggregate, scooped out of the side of an extinct Hawaiian volcano and graded, is being used without further processing in the extrusion process of forming prestressed-concrete planks.

Using two Dodd Extruders, Volcanite Ltd. of Honolulu is producing two planks: an 8-inch-thick hollow-core plank and a $2\frac{1}{2}$ -inch-thick plank, both 24 inches wide. These planks are produced in continuous strips the full length of the casting bed and cut by an abrasive saw to the required lengths. The planks are designed for use as either floor or roof members. Span and loading determine the number of prestressing strands used.



Moving at a speed of 3 to 5 fpm while being loaded with mix, this Dodd Extruder lays a plank that can be walked on one minute later. Aggregate from an extinct volcano is being used by Volcanite, Ltd., Honolulu. Stressing of the hollow-core high-strength planks depends on span and loading.



Each of the block-shaped extensions on the ring beam has two jacking points—one at the front and one at the back. Each is at a different elevation to allow the cables to cross.

and anchoring the 40-wire groups is used. The big squeeze actually shortens the diameter of the dome about $\frac{3}{8}$ inch. Wires are grouted to the conduit from a center connection.

Roof-raising ceremonies call upon the services of the Skyhook Lift Slab Corp., Kansas City, Mo. Using the Youts-Slick method, the 3-million-pound dome is lifted by hydraulic jacks mounted on top of each of the 36 columns. The 16-foot lift is expected to take about four hours.

The perimeter canopy adjoining the ring beam will then be completed.

The exposed Styrofoam of the interior will be coated with two layers of acoustical plaster. Working from the top of the earth mound, the plasterers need only a small amount of scaffolding to reach the underside of the dome. Finally, the mound of gravel will be returned to the pit. A ground slab of concrete will form the sloping floor of the auditorium.

Chester V. Lewis, Jr., president of Lewis Construction Co., stays in close touch with the work. His superintendent is Don Large. James O. Johnson is the architect, and Kenneth P. Ritchhart is the engineer. THE END

"Our 48 Ford Trucks have given maximum economy in every way!"

says Fred Newkirk, Manager of Materials Transportation Company, Inc., Corpus Christi, Tex.

"We are using Ford Trucks exclusively because they provide important savings—starting with a lower initial expenditure. We estimate that each Ford costs us about \$1,500 less than other makes of comparable size and capacity. Our maintenance and repair costs are less, too. The greater parts interchangeability on Ford Trucks makes it possible to reduce our parts inventory by about 50%; this frees \$2,500 of working capital. And in operating expenses, we save on gasoline because our Fords deliver an extra $\frac{1}{2}$ mile per gallon.

"They have proven more durable, too. For example, our 1958 Ford F-1000 has logged over

160,000 miles without even having the headspan off. We expect 200,000 miles from the Super Duties before a major overhaul. Some of our 1955 and 1956 Ford F-900's still have the original brake linings after 300,000 miles.

"Our trucks operate six days a week, and average fleet mileage is 51,000 miles per year. We haul 48,000-lb. payloads of bulk cement, 37,760-lb. payloads of sack cement for Halliburton Portland Cement Company. Our drivers are very enthusiastic about these new Ford Super Duties. They report that with 72,000-lb. gross Fords are smooth riding and easy to handle."

Solid testimony that Ford's full-time economy only starts with low price.

FORD TRUCKS COST LESS

PRODUCTS OF  MOTOR COMPANY

Distributor Doings

Unit Crane, Bay City appoint distributors

HATTON, Rickard & McCone Co., 13770 E. Firestone Blvd., Norwalk, Calif., has been named distributor in nine southern California counties for the complete crane-excavator line of Unit Crane & Shovel Corp., Milwaukee, Wis. It will also handle crawler-mounted crane-excavators and CraneMobiles manufactured by Unit's subsidiary, Bay City Shovels, Inc., Bay City, Mich.

Chesapeake Supply & Equipment Co., 1211-13 E. 25th St., Baltimore, Md., has been appointed a distributor

by Bay City for crawler-mounted crane-excavators and the full line of CraneMobiles. Its territory covers Maryland and Delaware, the District of Columbia, and part of West Virginia. The dealer has branches in Hyattsville, Md., and Dover, Del.

Changes at H. O. Penn

The H. O. Penn Machinery Co., Inc., distributor of Caterpillar diesel engines in New York and Connecticut has announced changes in its executive lineup. Miss Harriet Plotkin, former treasurer, is now secretary; John Mancuso moves up from as-

sistant treasurer to treasurer; and Robert C. Meyer, general service manager, has been appointed a trustee of the firm's pension plan.

Harry R. Killian, Jr., has been named office engineer for the Engine Division. From New York City headquarters, he will handle vendors' and customers' requirements on special engine installations.

Barber-Greene names

Barber-Greene Co., Aurora, Ill., has named Modern Machinery Co., Inc., 4412 E. Trent Ave., Spokane 6, Wash., to be distributor for all lines

of the company's construction and material-handling equipment. Its territory covers eastern Washington, northern Idaho, and Wallawa County in Oregon.

Buffalo-Springfield names new dealer

Parker Equipment Co., 2686 S. 2nd West, Salt Lake City, Utah, has been appointed a distributor for the state of Utah and two counties in Wyoming by the Buffalo-Springfield Co., a division of Koehring Co., Springfield, Ohio.

The dealer will handle the complete B-S line of compaction equipment, including 7 and 9-wheel pneumatic-tire rollers, 2 and 3-axle tandem rollers, 3-wheel rollers, and the 4-wheel Kompactor.

Mobilift appointments

The Mobilift Materials Handling Equipment Division of Motec Industries, Inc., Hopkins, Minn., has awarded franchises to three new dealers:

For counties in Illinois and Missouri—Morris Equipment Co., 4217 Meramec at Chippewa, St. Louis, Mo.

For parts of Pennsylvania, New Jersey, and Delaware—J. M. Fork Lift Service, Franklin Ave. and Bristol Pike, Cornwells Heights, Pa.

For all of New Mexico and El Paso county in Texas—Roadrunner Equipment Co., Albuquerque, N. Mex.

William Cornell opens Pacific dealership

W. C. Cornell, formerly with American Marietta and Frank G. Hough, has formed his own company at 462 Hester St., San Leandro, Calif. He will handle warehouse distribution and direct sales of products from the Nye Tool Co. of Chicago; the Milwaukee Electric Tool Co.; the American Chain Division of American Chain & Cable Co., Inc., Wilkes-Barre, Pa.; and others.

Oliver appoints

The Oliver Corp. has named P. M. Burns Farm & Industrial Supply, Woodland Road, Route 322 East, Clearfield, Pa., distributor for that area. It will handle the Oliver line of crawler and wheel tractors, and backhoes, loaders, bulldozers, angledozers, winches, fork-lifts, and similar attachments.

Dealers consolidate

The Cleveland Contractors Equipment Co. of Cleveland has purchased two Pittsburgh firms, A. T. Green Machinery Co. and Parkway Machinery, Inc., distributors of road-building machinery in western Pennsylvania and West Virginia.

Operations of the two companies will be combined. The main office will be at the Glenshaw, Pa., location of Green. A. J. Miller has been named general manager.



For more facts use Request Card and circle No. 271

This new H-120 Series "B" PAYLOADER has many improvements

which give added capacity, more digging power, better stability, lower maintenance and increased production

Since its introduction two years ago, the H-120 PAYLOADER has been acclaimed by contractors, materials producers, industrial users and their operators, for its reliable performance, high production and ease of operation.

Now, HOUGH's continuous program of research, development and refinement has made this series "B" model a better machine and an even better investment.

Added Capacity: Operating capacity is increased by 25% to 15,000 lbs. and bucket capacity is increased by 17% to 5 cubic yards. (S.A.E. rated)

Extra Stability: To supplement the increased capacity extra stability and balance have been achieved with a longer wheelbase, wider tread and continued use of dry ballast (100% heavier by volume than liquid) in rear tires which gives a lower center of gravity.

More Hydraulic Capacity: The capacity of both the main hydraulic pump and the steering pump has been increased, a total of 22%. This provides more reserve hydraulic power for lifting and breakout action and assures easy steering action even when the engine is idling.

More Digging Power: The increased hydraulic capacity and refinements in the boom geometry provide greater mechanical leverage for digging while maintaining lifting speeds.

Lower Maintenance: The loader mechanism features the same simplified design with a single bucket tilt cylinder and a minimum of pivot and grease points and fewer parts to service and maintain. There are actually from 4 to 10 fewer pivot points than on competitive units. Furthermore, all boom, bucket and steering pivot points have "O" rings or other seals to keep grease in and dirt out. A set of only three different hoses will service the entire loader hydraulic mechanism.

Keep-clean Hydraulic System: A valuable and exclusive HOUGH feature is the closed and pressure-controlled



PAYLOADER is convertible to this D-120 B PAYDOZER

hydraulic system to keep out air-borne dust and moisture. The new cylindrical, vessel-type reservoir has extra strength and the entire top is easily removed for thorough servicing. There is a full-flow filtering system with three micron filters.

"No-Stop" Full Power-shift Transmission: This HOUGH-built transmission is thoroughly proven to be without equal in the tractor-shovel industry. It is full-reversing, constant-mesh with four speed ranges in each direction. All shifts, up or down, forward or reverse, can be made "on-the-go" without stopping for any "range-shift" engaging of gears.

Convertible to a 'Dozer: The H-120 Series "B" has many other features and advantages, many of which are exclusive. These include the ability to convert it, quickly and economically, to a powerful pusher-dozer. With its 300 hp engine, high dumping clearance and long reach it is the best buy in big tractor-shovels.

Your HOUGH Distributor is ready to prove it to you.

THE FRANK G. HOUGH CO.		11-B-1
762 Sunnyside Ave., Libertyville, Ill.		
<input type="checkbox"/> Send full data on the H-120 B PAYLOADER		
<input type="checkbox"/> Send full data on the D-120 B PAYDOZER		
Name _____		
Title _____		
Company _____		
Street _____		
City _____	State _____	

HOUGH®



THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY - INTERNATIONAL HARVESTER COMPANY



HOUGH, PAYLOADER, PAYDOZER, PAYMOVER, PAYLOGGER, PAYLOMATIC and PAY are registered trademark names of The Frank G. Hough Co.



PAYLOADER®



Tunnel for telescopes

Astronomers at Kitt Peak National Observatory, 40 miles southwest of Tucson, Ariz., where the world's largest solar telescope is under con-

A tunnel is being built through a mountain at about a 32-degree angle at Kitt Peak National Observatory near Tucson, Ariz. An Airplaco unit supplied with concrete by a Jaeger transit mixer is at work here.

struction, will go underground to study the sun.

More than 7,000 cubic yards of granite have been blasted away in construction of a 380-foot-long optical tunnel and spectrograph shaft to the top of Kitt Peak. The 17-foot-diameter tunnel, which bores into the mountain at an angle of approximately 32 degrees, will connect at the

surface concrete inch plan this will beams of mirrors tion room will prov inches in The pr

Mobile melters may solve snow-removal problems

■ New York City, long plagued with a snow-removal problem, may just dump the whole thing into mobile snow melters. Utilizing a principle known as "submerged combustion," these machines melt snow almost instantaneously, and the water drains into the sewer system at the rate of about 300 gpm.

The melter's original concept was discovered by Esso Research & Engineering Co., Linden, N. J. Thermal Research & Engineering Corp., Conshohocken, Pa., developed and built the model that was demonstrated last summer, using shaved ice for the test.

The mobile model is the same size as a standard semitrailer. The top of the tank into which the snow is loaded is 8 feet 9 inches high. A 60-gph high-heat-release oil burner is mounted at each end of the unit. A cylindrical oil tank with a 1,045-gallon capacity is on the front end. Oil, along with air from a blower, is piped to the burners, and the resulting hot combustion gases shoot into the tank, heating and agitating the water.

Less than 2 gallons of fuel oil is needed to melt one ton of snow, it is claimed.

It is estimated that 30 to 40 mobile snow melters could quickly clear all major arteries in the city after a heavy storm. The unit tested can melt in one hour an amount of snow equal to 40 truck loads.

Borg-Warner film on plastic pipe

■ The Marbon Chemical Division of Borg-Warner Corp., Washington, W. Va., has released a new 20-minute, 16-mm color film on ABS semirigid plastic pipe made of Marbon Cycloac polymers.

The film shows scenes of piping installations in Kansas, Arizona, and California, demonstrating how the pipe reduces initial cost as well as installing, handling, and maintenance costs.

The film may be obtained on loan for individual companies, professional or technical organizations, schools and other educational groups, by writing to Film Dept. C-2, Marbon Chemical Division, Borg-Warner Corp., Washington, W. Va.

So what else is new? Just

Many "new" features and components now being announced in the latest models of crawler tractors, scrapers and other earthmoving equipment have been standard equipment in Euclids for years. Developed, pioneered and improved by Euclid, these job proved features have been cutting costs and providing bonus production for "Euc" owners long before competitive manufacturers adopted and announced them as their own product improvements.

FULL-POWER SHIFT Euclid's first use of power shift was in "twin power" models in 1946; has been a feature of all torque converter rear-dumps, scrapers and bottom dumps since that time; "standard" on all "Euc" crawlers since 1954 ... 15 years of field experience!

HYDRAULIC SCRAPER OPERATION bowl, apron and ejector operation of Euclid scrapers has always been hydraulic ... even those models built prior to World War II utilized hydraulic lever action ... basic hydraulic design of current models was first announced in 1948.

PLANETARY DRIVE a Euclid feature on rear-dump and bottom-dump haulers since the middle 30's, on all "Euc" self-propelled machines that have been introduced since, including scrapers and crawler tractors.

ALL-WHEEL DRIVE Separate engines, torque converters and semi-automatic transmissions for each of 2 drive axles have been used in "Euc" Rear-Dumps and "Twin" Scrapers since 1948 ... overhung engine scrapers with power on all four wheels were introduced in 1954.

UNITIZED ASSEMBLY AND SERVICE ACCESSIBILITY

Ease of servicing, as compared with competitive machines, has always been a design feature of "Eucs" ... since 1946 all torque converter models have utilized a converter-transmission "package" that saves time for repair or replacement ... Euclid crawlers are designed to save hours of labor by making it easy to service all major components ... engine, radiator, transmission, drive sprocket, final drive, etc. can be replaced in far less time than on any comparable tractor.

Only EUCLID offers all of these features ... and they've been standard for years!



EUCLID

DIVISION OF GENERAL MOTORS, HUDSON, OHIO
Plants at Cleveland and Hudson, Ohio and Lanarkshire, Scotland

Plasted into mountain

surface with a 110-foot steel and concrete support tower for an 80-inch plane mirror called a heliostat; this will track the sun and reflect beams of sunlight by means of tunnel mirrors to an underground observation room where a giant spectrograph will provide sun images up to 34 inches in diameter.

The project, which is being pushed

to 1962 completion by Western-Knapp Engineering Co., San Francisco, is being built for the National Science Foundation by the Association of Universities for Research in Astronomy, Inc.

Severely jointed granite, ranging from hard and fresh to soft and decomposed, was encountered by the contractor in the underground drill-

ing operation. The joint patterns made it nearly impossible to hold the outline of the workings with the trim holes. As a result, every round produced a jagged outline dependent upon the intersected joint pattern.

Some 900 $\frac{3}{4}$ -inch \times 6 and 8-foot rock bolts were used, with 5,000 square feet of 2 $\frac{1}{2}$ -inch \times No. 12 mesh for ground support. Four steel sets were

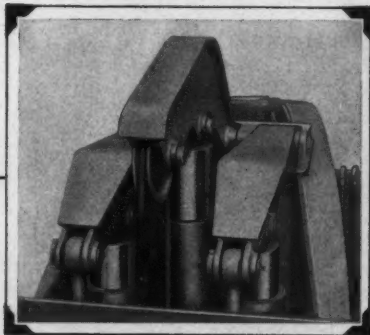
required to portal the exit tunnel, and 15 steel sets to portal and support the lower optical tunnel.

Stu Hurdle, Western-Knapp job superintendent, reported that 35,500 feet of blast and bolt holes were drilled using Sandvik Coromant drill steel at an average steel cost of 4 cents per foot. Drilling equipment consisted of seven Atlas Copco Tiger rock drills with airlegs and two Thor jackhammers. An Atlas Copco RH rotation Falcon stoper was used to set rock bolts and mesh. Air was supplied by a Jaeger 600-cfm rotary compressor, with an Airplaco placement system.

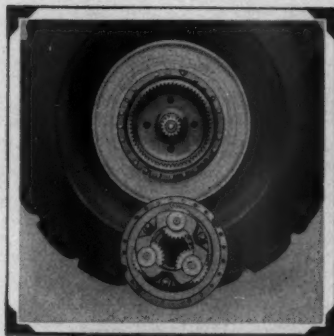
ust to set the record straight!



new in 1946!



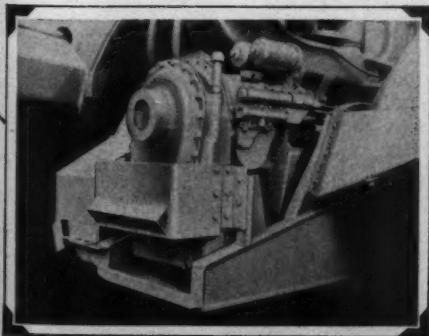
new in 1948!



Pioneered by Euclid, many of today's "new" features in earthmoving equipment have been providing bonus performance to "Euc" owners for years... the record speaks for itself!



new in middle '30's!



Torque converter-transmission "package" new in 1946!



new in 1954!



Severely jointed granite made drilling extremely difficult. Sandvik Coromant drill steel in an Atlas Copco Tiger rock drill with airleg, such as is being used here, put down some 35,500 feet of blast and bolt holes.



Crews handle rock work where the tunnel emerges from the mountain. The 17-foot-diameter tunnel breaks surface here to rise to the top of the 110-foot steel support tower for an 80-inch plane mirror called a heliostat.

For more facts, circle No. 273

Now there's a
Mack M Model for



every practical off-highway job...

A year ago two new Mack M Models—a 45-ton six wheeler and 30-ton four wheeler—made their debut to receive an immediate acceptance unprecedented in off-highway operations. Now four additional M's are ready to take their place alongside the trailblazing two—a 15, 18, and 25-ton four wheeler and a 30-ton six wheeler. This pace-setting line of heavy-duty rear dumpers and tractors introduces a new dimension in profitable and practical off-highway hauling.

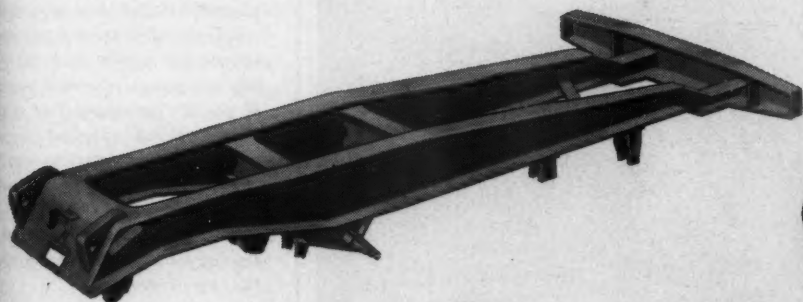
What's so special about the Mack M Models? To mention but a few features, there's a completely new cab design . . . there are improved new high strength, light-weight, longer-lasting single floor bodies—with or without heated floors . . . there are new Mack axles and bogies . . . there are newly engineered, extra sturdy frames . . . there are power options up to 525 hp to provide the getup and go that meets any challenge.

Most special of all, they're Macks . . . finest products of a line that has worked its way to the front in heavy-duty off-highway service. Add the extra features of the new M Models to Mack's already firmly established reputation for getting the job done at lower operating cost and with minimum downtime, and you come up with the answer to true off-highway efficiency.

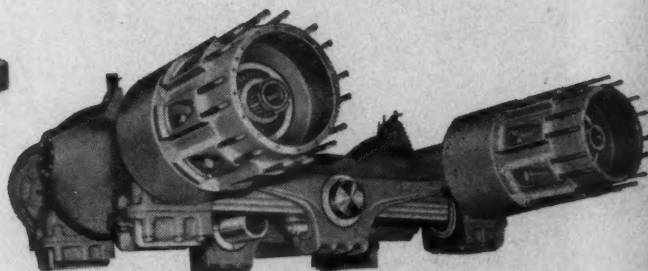
To select the right Mack for your own operations, contact your nearest branch or distributor. He's all set to show you what's so special about a Mack. Mack Trucks, Inc., Plainfield, New Jersey. Mack Trucks of Canada, Ltd., Toronto, Ontario.

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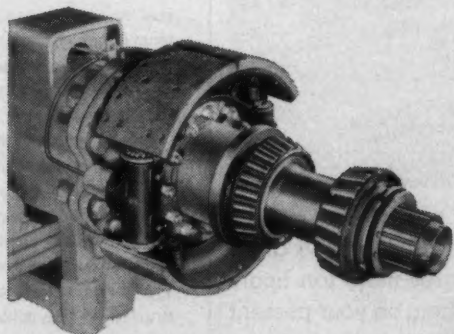
MACK FIRST NAME FOR TRUCKS



A NEW DIMENSION IN FRAME STRENGTH—Built to shrug off jarring shovel drops, the extra solid, extra strong five-cross-member frame of the M30X Mack is typical of the engineering advances in all M Models. Welded crossmembers, including integral front and rear bumpers, tie alloy steel fabricated I-beam main rails together.



A NEW DIMENSION IN BOGIE PERFORMANCE—Indicative of advances in all Mack M Models, this newly designed heavy-duty twin-axle bogie on six-wheeler M45SX offers the strength and simplicity of straight-through drive and single-reduction carriers with Mack Planidrive reduction at the hubs. Unusual bogie flexibility results in exceptionally long tire life, reduces frame twist and wracking and keeps all wheels equally loaded. Suspension is through walking beam and flat leaf springs.



A NEW DIMENSION IN BRAKING SURENESS—Safe, sure braking power for maximum control at all times is another feature of all M Model Macks. Illustrated here is the air hydraulic rear braking assembly for the M30X and M45SX. Front brakes are air; rear are air hydraulic with separate master cylinders for extra safety factor.



A NEW DIMENSION IN FRONT AXLE LOADING—The new tubular front axle, featuring steel tubing seven inches in diameter with walls $\frac{3}{4}$ " thick, provides a reversed-elliot front axle for the M45SX and M30X that easily withstands the additional loading made possible by Mack's new forward cab location.

Avoid legal pitfalls

Contractor enjoined from interfering with pickets

THE PROBLEM: A New Mexico contractor operating within the state employed only non-union labor and paid wages below the local union scale. Union spokesmen attempted to persuade him to pay union-scale wages although his employees had expressed no desire to unionize. On his refusal, pickets peacefully carried signs at job sites stating that the contractor was unfair to organized labor. The contractor and his superintendent, and on at least one occasion, two em-

ployees, assaulted and beat the pickets. Was the National Labor Relations Board entitled to a court order requiring the contractor to desist from interfering with peaceful picketing by persons not employed by him?

THE ANSWER: Yes. (National Labor Relations Board v. McBride, 274 Fed. 2d 124, decided by the United States Court of Appeals, Tenth Circuit, one of the three sitting judges dissenting.)

All three judges agreed that the

legality of the contractor's acts depended upon whether they tended to discourage his employees from joining a union. Two judges answered that question yes. Gist of the majority view:

It was probable that the contractor's violent attacks on the pickets over several months would be regarded by his men as showing—although not so intended—how he would regard an attempt on their part to unionize, and the National Labor Relations Act is intended to insure employees the right to form independent opinions or decisions,

free from undue employer influence, regarding their allegiance to labor organizations.

The dissenting judge pointed out that there was no dispute between the contractor and his employees. There was no effort upon the part of the union to organize the employees. The purpose of the NLRB Act is not to strengthen unionism but to protect employees in their right to make a free choice. The fact that violence formed the background in this case neither set nor restricted the power of the board in dealing with unfair labor practices. Regardless of how reprehensible the conduct, the act was not intended to confer on the board general police power covering all acts of violence by a union or an employer, but prohibits only such acts as are directed against the exercise by employees of rights guaranteed by the law.

Contractor was bound by implied agreement

THE PROBLEM: A contractor designed the building that he constructed, and installed structural steel having a weight-bearing capacity of 30 pounds per square foot, although a city ordinance required a capacity of 40 pounds per square foot. City officials required substitution of the heavier-capacity steel or the installation of additional steel support and side stress support.

Was the contractor entitled to extra pay for the cost of complying with the city's order?

THE ANSWER: No. (Shimek v. Vogel, 105 North Western Reporter, 2d, 671, decided by the North Dakota Supreme Court.)

The court said that there was an implied agreement by the contractor to comply with the ordinance. Every contract is made subject to existing law, and every law affecting a contract becomes part of it.

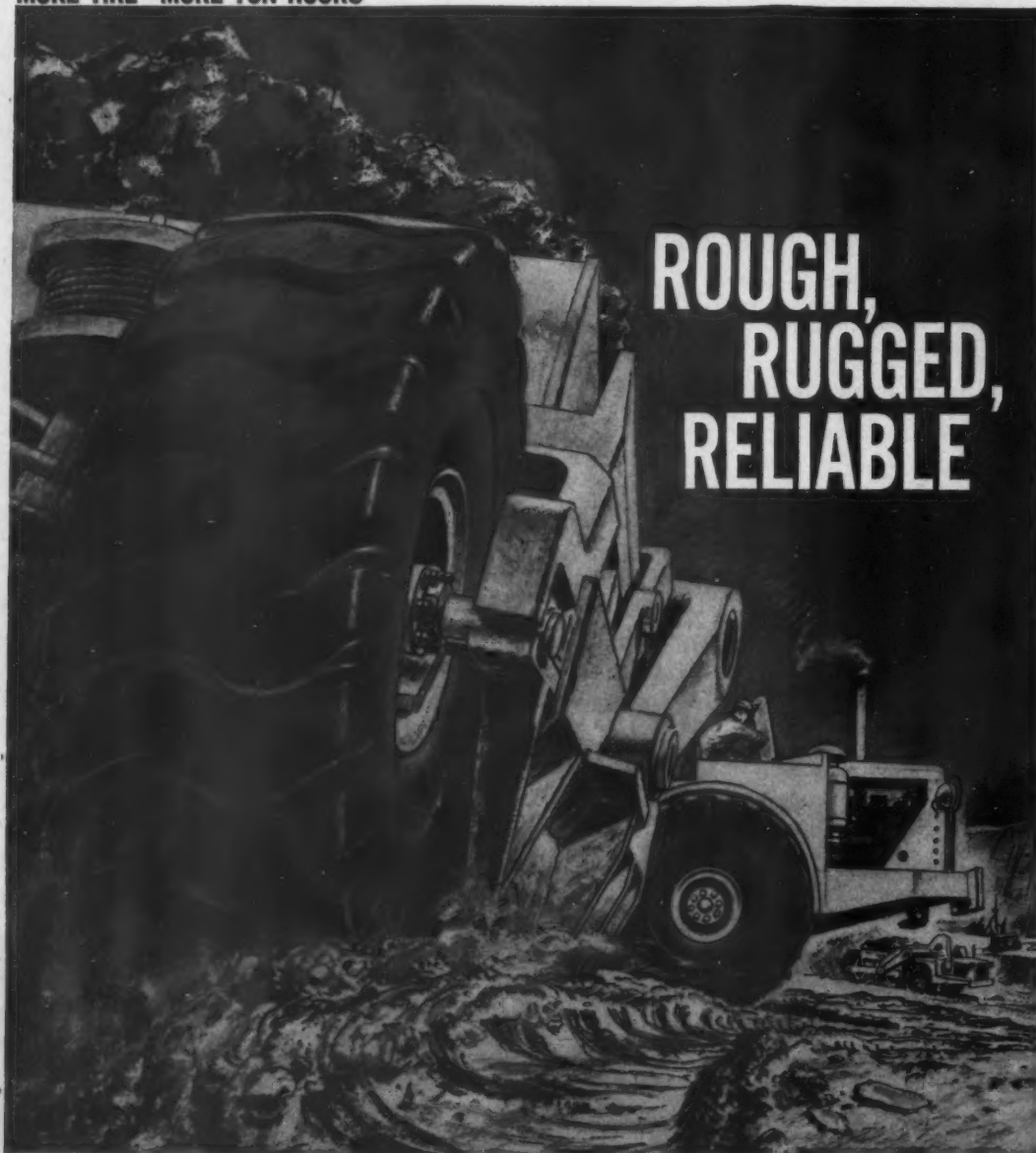
The court also applied the following rules to other matters litigated by the parties:

Provision in a written contract that no changes in work shall be made unless provided for in writing and signed by both parties is waived to the extent that changes are made under an oral agreement.

A building construction contract drafted by the contractor is, in case of ambiguity, interpreted against him.

Provision that work shall be completed to the satisfaction of an owner is construed to mean that the work must be done in such a manner as to reasonably satisfy the owner, who cannot capriciously reject the work.

MORE TIRE—MORE TON HOURS



U.S. ROYAL CON-TRAK-TOR—FULL LUG Built burlier to take it under the roughest conditions • Increased resistance to impact and rock penetration • Wide, full-lug tread gives more ground-gripping contact and flotation—resists side slippage and assures more ton hours of service • More durable carcass—more tires retreadable • Prove-test them on your present equipment, specify them for your new machines • Call your U.S. ROYAL DEALER today for sure.

U.S. ROYAL  **TRUCK TIRES**  **UNITED STATES RUBBER**

For more facts use Request Card and circle No. 275

Manufacturer Memos

Esco Corp., Portland, Ore. has elected **J. J. Davis** president; **Newman Ward** is now chairman of the board, and **C. F. Swigert, Jr.**, honorary board chairman. Davis was formerly executive vice president of the company, which manufactures cast-alloy products, distributes stainless-steel mill products, and serves as a jobbing foundry.

Richard C. Kremer has been appointed executive vice president of **Continental Rubber Works**, Erie, Pa. He had been vice president, general sales, of the Ohio Rubber Co.

Sprague & Henwood, Inc., Scranton, Pa., has appointed **Joseph Parker** Nashville regional manager with offices at Mt. Juliet, Tenn. He will handle both mining and foundation investigations.

The firm has opened a western regional office at 2151 N. Redwood Road, Salt Lake City, Utah. **Robert R. Carver**, vice president of the company, has been appointed manager of the new branch.

Donald R. Makins has been named advertising manager of **Austin-Western**, Construction Equipment Division of Baldwin-Lima-Hamilton Corp., Aurora, Ill. He will direct all the company's line of power graders, hydraulic cranes, road rollers, etc.

Black & Decker Mfg. Co., Towson, Md., has named **Arthur S. Boehm** to the new position of sales manager of its industrial-automotive division. He was formerly eastern region sales manager of the division.

In other shifts, **Lester C. Kaefer** is now district manager of a new Pacific Coast district, and **Thomas H. Madux** has been named sales manager of Master Power Corp., Solon, Ohio, air-tool manufacturing subsidiary of the firm.

In the consumer-products division, **Joseph H. Schmidt, Jr.**, has been appointed general sales manager; **Richard T. Scott**, assistant general sales manager; **Edwin J. Bernau**, premium sales manager; and **Edward M. Stuart, Jr.**, assistant marketing manager.

General Motors Corp., Truck & Coach Division, Detroit, Mich., has announced the appointment of **C. V. Crockett** as director of defense products. **H. O. Flynn** succeeds him as chief engineer. **R. E. Field** and **D. J. LaBelle** have been appointed assistant chief engineers for trucks and coaches, respectively.

American Manganese Steel Division of American Brake Shoe Co., Chicago Heights, Ill., has transferred **J. G. Fagan**, sales representative, to Portland, Ore., where he will handle both welding products and wear-resistant alloy castings for the Pacific Northwest region. He had been in Oakland, Calif., for 10 years, as Amasco's West Coast welding-products salesman.

Barry R. Boyens has been named construction-equipment district representative for the Peoria branch of **Oliver Corp.**, Chicago, Ill. He will work with the firm's construction and industrial - equipment distributors and dealers in Illinois, Indiana, and parts of Kentucky and Missouri.

SKF Industries, Inc., maker of rolling bearings, has announced the formation of an Automotive Products Division and the appointment of **Edward C. McGinley** as its manager. The division will market a complete line of bearings and seals.

Malsbary Mfg. Co., Oakland, Calif., has named **J. Walter Lautenberger, Jr.**, chief engineer. He will supervise research and development programs for the company's steam cleaners, steam generators, and water heaters.

Malsbary has also realigned five sales regions. They will be administered by: **Robert L. Garrison**, Cicero, Ill., to cover east north-central United States; **Asa T. Bearse, Jr.**, Atlanta, southeast U. S., plus Louisiana and Texas; **Larry Glim**, Blue Island, Ill., west north-central U. S. and central Canada; **Victor F. DeVinny**,

Maplewood, N. J., northeast U. S. and eastern Canada; **Clem Starlin**, Salt Lake City, Rocky Mountain states, the Pacific Northwest, and western Canada.

Peter S. Barno has been elected vice president of employee and public relations for **Werthington Corp.**, Harrison, N. J. He succeeds **William A. Melter**, now vice president of the firm's Washington Services.

Vincent deP. Gerbereux has been named director of marketing services for the corporation; and **Raymond E. Young**, acting comptroller.



**You Can Put
This Line Together
With a Hammer**

The combination of NAYLOR Spiralweld pipe and Wedgelock couplings can save you time, work and money on piping for air, water, dredging or ventilating service on construction jobs.

Here's why. This distinctive line has the strength and safety required for rugged jobs. And you can put it together with a hammer. The pipe is light in weight, so it's easy to transport and handle. Connections are simple and fast, too, with the Wedgelock coupling. It is designed to join grooved-end pipe quickly—even with only one side of the pipe in the open. No special tools are required—a hammer is all you need to connect or disconnect the line.



NAYLOR Wedgelock couplings make a positive connection securely anchored in standard weight grooved ends.

For details on this dependable NAYLOR piping combination, write for a copy of Bulletin No. 59.



**NAYLOR
PIPE** Company

1270 East 92nd Street, Chicago 19, Illinois

Eastern U. S. and Foreign Sales Office: 60 East 42nd Street, New York 17, N. Y.

For more facts use Request Card and circle No. 276

LW D 'PULL* WITH 10-YD ELEVATING SCRAPER has a place on

You can use it on any and all of these applications...THESE OWNERS† DO.....

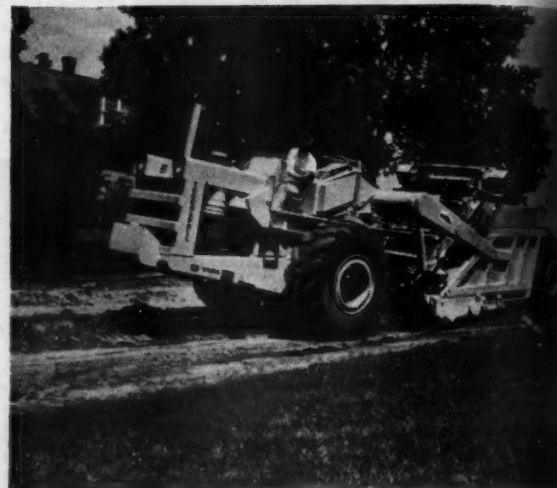
1. General cut-and-fill
2. Clean-up earthwork
3. Spread base materials between forms
4. Repair roads, shape shoulders, clean ditches
5. Subdivision streets, site preparation, backfill to foundations
6. Finish for landscaping, stockpile topsoil
7. Grade streets, alleys, renewal projects
8. Sanitary landfill garbage disposal
9. Grade parks, beaches, school grounds
10. Build small dams, stock ponds, tanks
11. Level, terrace irrigated land
12. Remove mine, pit overburden
13. Load and haul sand, gravel, peat, coal, sawdust, wastes
14. Blend and load mixtures of materials
15. Remove snow

Materials it will load

1. Topsoil
2. Loam
3. Sand and loose gravel
4. Clays, except highly plastic clays when super-saturated or baked brick-hard
5. Clay mixtures and other soft materials
6. Rocks to 12" that occasionally occur with dirt; rocks to 28", individually loaded

Materials not recommended

1. Slab rock
2. Shale, unless well broken
3. Solid-packed gravel in hard clay, unless broken
4. Rip-rap and rock-type materials



MINNESOTA — Contractor time-studied his LeTourneau-Westinghouse "D" with Hancock scraper on street rebuilding, found *this one self-loading machine replaced front-end loader, three trucks, four operators — outproduced them by over 90 yds per day!*

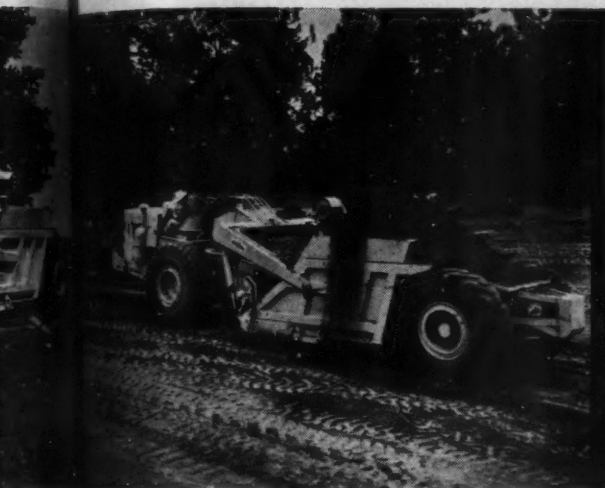


MISSOURI — "Since we never have to use a pusher with our 'D' and Hancock," reports owner, "we assign our push-tractor to dozing where it's making money for us. This LW machine has also increased our operating efficiency over 30 percent!"

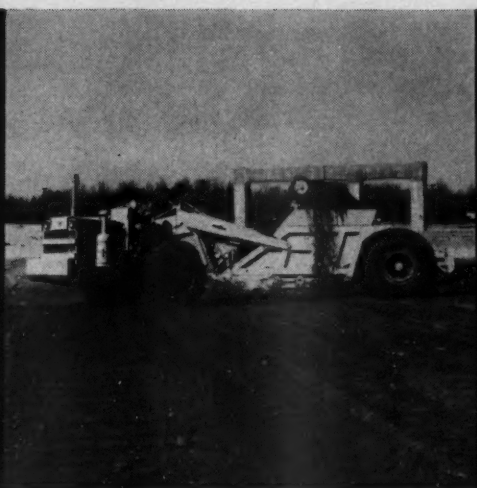
We will be happy to give you complete details on the 143-hp D Tournapull with 10-yd Hancock elevating scraper. Available with step-gear or torque-converter transmission, speeds to 30 mph. You can also interchange elevating scraper for a conventional 9-yd LW scraper or 11-ton LW Rear-Dump. Ask for a demonstration.

every dirtmoving job

2..... AND LOOK AT THE RESULTS:



TEXAS—Grading streets for subdivision, this D'Pull with elevating scraper picked up heaped loads of dirt and clay in an average of 30 seconds. Owner of the LW machine is well satisfied with performance, *likes its money-saving permit-free roadability.*



MICHIGAN—"Really loads up fast, extremely versatile and useful," says this road contractor. His 143-hp D Tournapull® cuts drainage ditches, hauls gravel, handles finishing and clean-up. Frees his big scrapers and pushers for production work.



NEBRASKA—Conservation contractor teams up 3 "D"-Hancocks on large projects like this irrigation feeder canal. And, on small land-leveling and water control projects, these one-man, self-loading machines work alone on separate, scattered jobs.



CALIFORNIA—This contractor supplements "big" earthmovers with self-loading "D" for lower costs on odd-lot and clean-up work. Here, on a large freeway project, D'Pull-Hancock loads-out windrowed dirt and shoulder base materials, filled low areas.



FLORIDA—Leveling 500 acres for use as a citrus grove, "D"-Hancock loaded and hauled sand, marl and clay. Self-loading unit allowed expansion of contractor's dirtmoving capacity by one scraper, *without requiring the addition of another push-tractor!*



WISCONSIN—"We save \$19,500 a year in push-tractor costs because this machine works *alone*," comments owner of gravel-pit and contracting firm. At pit, "D" strips overburden and hauls gravel to stockpile — also travels highways to earthmoving jobs.

† Names and addresses will be supplied on request.

*Trademark DPH-2480-DCJ-2



LETOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILL.

A Subsidiary of Westinghouse Air Brake Company

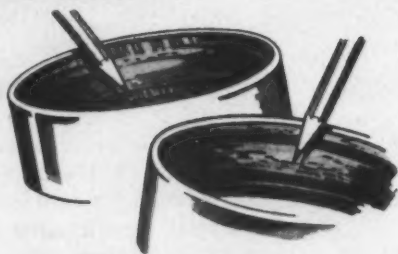
Where quality is a habit

For more facts use Request Card and circle No. 277

CREWS ASSEMBLE an 18-foot-diameter culvert at the site of a former highway bridge near Carlton, Minn. The 134-foot-long 5 per cent elongated structure will be covered by an 8-foot embankment to carry traffic across the overflow channel of a power plant. Armco Drainage & Metal Products, Inc., installed the 8-gage Multi-Plate sections of the culvert, designed by the Minnesota Department of Highways using Armco's ring-compression theory allowing for lighter and larger corrugated-metal structures under higher fills.



DISTRIBUTOR DAN, the SKF bearing man, shows HOW TO PROTECT YOUR BEARINGS IN THE FIELD



DIRT AND MOISTURE DID THE DAMAGE. The bearing ring on the left failed prematurely because fine dirt particles acted as an abrasive, causing wear. The bearing on the right had to be replaced because of the abrasive action of rust.



START WITH PROPER STORAGE. New bearings come wrapped in dustproof paper. If this wrapping is opened or torn, wash the bearing. Use a clean pail of kerosene or light oil. Dry bearing with compressed air, then dip in anti-rust compound, rewrap and box.



LOVE THAT LUBRICANT and those oil cans and grease guns! Clean oil and grease will carry dirt out when they purge the old lubricant. Whereas, dirty oil and grease carry dirt with them into the bearing. So keep your lubricating equipment clean and don't use lubricants that have been exposed to dust and dirt.



SAVE YOURSELF SEAL TROUBLE. Replace bent or worn seals (which allow dirt to enter) when you install or inspect bearings. You can now get tight, effective double-lipped TySeal tapered roller bearings that fit exactly the same space as standard unsealed tapered roller bearings.



A BEARING IS A BARGAIN! For relatively little money you get a bearing that's made of fine steel which has been heat treated, machined, polished, tested and checked over 100 times. Treat your bearings right and they'll give you the thousands of hours of operation for which they're engineered.

**BEAR DOWN ON BEARING DOWNTIME—RELY ON THE
TECHNICAL SERVICE OF AUTHORIZED SKF
DISTRIBUTORS**

SKF MOTION ENGINEERING



Advanced ball and roller bearing technology

For more facts use Request Card and circle No. 278

Convention Calendar

November 6-7 U. S. Government Construction Contracts Conference

Conference and dinner, Lisher Auditorium, George Washington University, Washington, D. C., and Statler Hilton Hotel, Washington, D. C. COC, The National Law Center, George Washington University, Washington 6, D. C.

November 13-18 Short Course on Concrete and Concrete Aggregates

Annual course held at the University of Maryland, College Park, Md. Statler Walker, National Sand & Gravel Assn., 1411 K St. N.W., Washington 5, D. C.

November 17-18 Bituminous Concrete Highway Conference

Conference to be held at University Park, Pa. The Continuing Education Conference Center, The Pennsylvania State University, University Park, Pa.

November 20-21 N. J., N. Y., and Northeast States Testing Engineers Association

Annual meeting, Statler-Hilton Hotel, Boston, Mass. J. E. O'Neil, Research and Materials Engineer, Massachusetts Dept. of Public Works, 99 Worcester St., Wellesley Hills 81, Mass.

November 27-30 American Institute of Steel Construction

Annual convention, Boca Raton Hotel and Club, Boca Raton, Fla. L. Abbott Post, executive vice president, AISI, 101 Park Ave., New York 17, N. Y.

December 8-9 Contractors Management Conference

Meeting, Pleasant Hall, Adult Education Center, Louisiana State University, Baton Rouge, La. General Extension Division, Louisiana State University, Baton Rouge, La.

December 11-14 Weed Society of America

Meeting, Sheraton Jefferson Hotel, St. Louis, Mo. Dr. O. Hale Fletchall, College of Agriculture, University of Missouri, Columbia, Mo.

January 15-18 National Concrete Masonry Association

Forty-second annual convention, Americana Hotel, Bal Harbour, Fla. NCMA, 1015 Wisconsin Ave. N.W., Washington 7, D. C.

January 15-19 National Limestone Institute, Inc.

Meeting, Roney Plaza Hotel, Miami Beach, Fla. NLI, 210 H St. N.W., Washington 1, D. C.

January 28-February 1 Associated Equipment Distributors

Forty-third annual meeting, Hilton Hotel, Chicago. AED, 30 E. Cedar St., Chicago 11, Ill.

Total income on Maryland's toll roads set a new record for the fiscal year ending September 30, 1961—a 6.16 per cent increase to \$16,013,943.

CONTRACTORS AND ENGINEERS

Try these steps for care of gyratory crushers

Maintenance of crushing equipment—and all other machinery and tools, for that matter—is far from simply a matter of repairs after something has gone wrong. The best maintenance is preventive maintenance, which means proper installation, proper operation, and regular checks of wear points and potential trouble spots.

Here are maintenance tips and check lists recommended by Allis-Chalmers for the proper care and operation of gyratory crushers.

Plan a program

The first step in preventive maintenance is to make sure the equipment is properly installed. The manufacturer's accompanying instructions should be carefully followed. If some of the points are not clear, insist on clarification; he owes it to you.

Keep your crushing equipment well lubricated. Follow the manufacturer's recommendations on the type of lubricant to be used and his lubricating instructions. Much time and money are spent by the equipment manufacturer to arrive at the best lubricating program for your machine. Don't experiment; benefit from his advice.

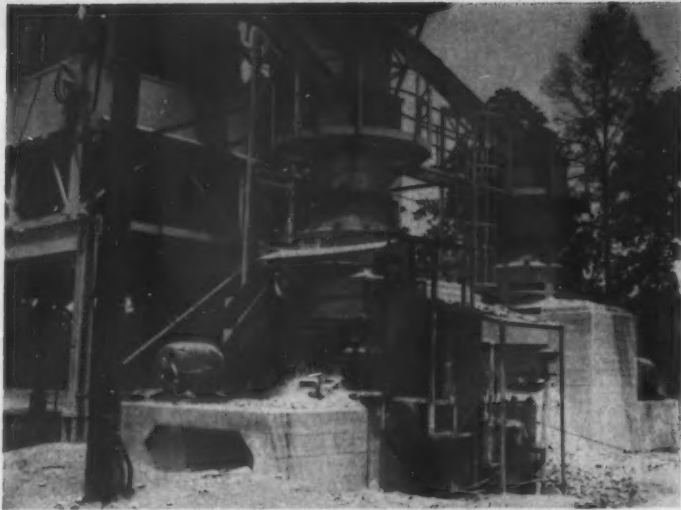
Analyze feed requirements for adequacy. Make sure that feed arrangement is large enough and that the material is evenly distributed. Be sure that conveyors (discharge) are handling material capably so that there is no product backup to hamper machine operation.

Maintain a record of the operating hours of the crusher and its allied equipment. After a predetermined period of operation, give the crusher a complete major inspection.

Here are suggested daily, weekly, and major

(Continued on next page)





Maintenance Dept.

(Continued from preceding page)

maintenance check lists to aid in the care of your equipment:

Daily

LUBRICATION SYSTEM

Check oil in storage tank. Be sure

The Chantilly Crushed Stone Co., a subsidiary of C. J. Langenfelder & Son, Inc., contractor, uses two A-C Model 751 Hydracone tertiary crushers to process traprock for aggregate. Regular checks for wear are the key to continued high-capacity operation of units like this.

it is $\frac{3}{4}$ full when crusher is idle and $\frac{1}{4}$ full when crusher is operating.

With oil pump shut down, check oil filter by turning handle to drain oil sludge from the cartridge through the petcock.

Check oil pump. Grease if needed.

HYDRAULIC SYSTEM

Check oil storage. It should be full before crushing head is set and full if head is near operating position. Tank should not be filled, as it will overflow if head is lowered somewhat.

Check supply lines and bottom-plate cover gasket, after crusher and feed are started, for leaks. Any leaks will cause a loss of crusher setting.

Check close side setting with a chunk of lead (see Weekly check list). Do not set crusher closer than recommended. Set crusher when crushing chamber is empty.

SPIDER BEARING AND PINION-SHAFT HOUSING

Check spider-bearing oil level. Level should be about 1 inch above spider bearing. If too much oil is being used, check oil seal; if necessary, use heavier oil.

On larger crushers, check oil level on pinion-shaft housing.

GENERAL

Check drive belts for wear, looseness, turning, and breaks.

Check for loose bolts and parts—with crusher operating—and tighten where necessary.

With crusher operating, check oil screen for metal chips. Although a small amount of chips will be noticed, a sudden increase indicates excessive pressures on the bearing surfaces and possible failure.

Check for excessive noise when crusher is operating.

Check return-oil temperature every hour until it levels off.

Check oil temperature when changing shifts and at shutdown.

Weekly

Check all items shown on the Daily check list.

LUBRICATION SYSTEM

Check for dirt and sludge. If the system appears dirty, check the filter and replace cartridge if necessary. Change oil when there is dirt suspended in it or when a large amount of sludge has formed in the bottom of the storage tank. Drain the tank and clean and refill with new oil when necessary.

Check all oil lines and crusher joints for leaks.

Lubricate oil-pump motor.

Check oil pump for noise and wear.

HYDRAULIC SYSTEM

Check crusher to see if it is holding setting by passing a chunk of lead, resuming crushing, and then passing another chunk of lead. The two



You are on the right track here. For the big lifts or ordinary loads Leschen Red-Strand is universally accepted and demanded by wire rope users who expect and get their money's worth. • Constant research and development have provided Leschen users with a complete range of sizes and types for every conceivable task. This versatility, backed by Leschen's distribution and technical services, is your assurance of wire rope dependability for every job. • Accept nothing less than Leschen. For the name of your nearest Leschen distributor write: Leschen Wire Rope Division, H. K. Porter Company, Inc., 2727 Hamilton Avenue, St. Louis 12, Missouri.

PORTER

**LESCHEN WIRE ROPE DIVISION
H. K. PORTER COMPANY, INC.**

For more facts use Request Card and circle No. 279

s idle and
erating.
own, clear
e to drain
re through
if needed.

A-C Hydrocone crusher
installed with twin con-
or belts and a special
to remove crusher dis-
arge. Discharge on all crush-
units should be adequate
handle surge conditions,
ring smooth flow to sub-
ent processing areas.



d bottom-
crusher and
Any leaks
setting.
ing with a
check limit.
can recom-
a crushing

chunks should have the same approx-
imate size if crusher setting is main-
tained. If they do not, check the
bottom-plate cover and supply lines
for leakage, and the V-packing on the
bottom of the step support piston for
wear or cracking.

PINION SHAFT

Check oil level. Oil level should not
decrease unless oil seal is damaged
or leaking. Replace if necessary.

GENERAL

Check mantle and concave rings
for wear and cracks. Check space
between head nut and bottom of
spider to determine amount of wear.

Check dust seal for wear and dust-
seal retainer for tightness to prevent
breaking of studs.

Major

Check all items on Daily and
Weekly check lists.

Disassemble the crusher and in-
spect the following:

Bottom shell for wear.
Bottom-shell bushing for wear and
scoring.

Bottom-plate bushing for wear or
scoring.

Tapered surface of bottom and top
shell for movement or wear.

Top shell for wear.

Outside and inside bearing and sur-
face of eccentric for wear and scor-
ing.

Shaft surface below and above
crushing gear. (It should be smooth
and free of score marks.)

Clearance between spider bushing
and main-shaft sleeve. (It should be
less than 1/6 inch.)

Teeth of pinion and drive gear for
wear.

Step bearing and eccentric wearing
plate for wear and scoring.

Piston and packing for wear. Pack-
ing for cracks.

Spider arm shields.

All seals for leaks. (Replace if
necessary.)

While crusher is running, drop in
pieces of lead at four different places
around the crusher to check wear on
the concave ring. If the four pieces
measure the same after passing
through, the ring is round. If not, the
ring should be turned, or replaced if
wear is excessive.

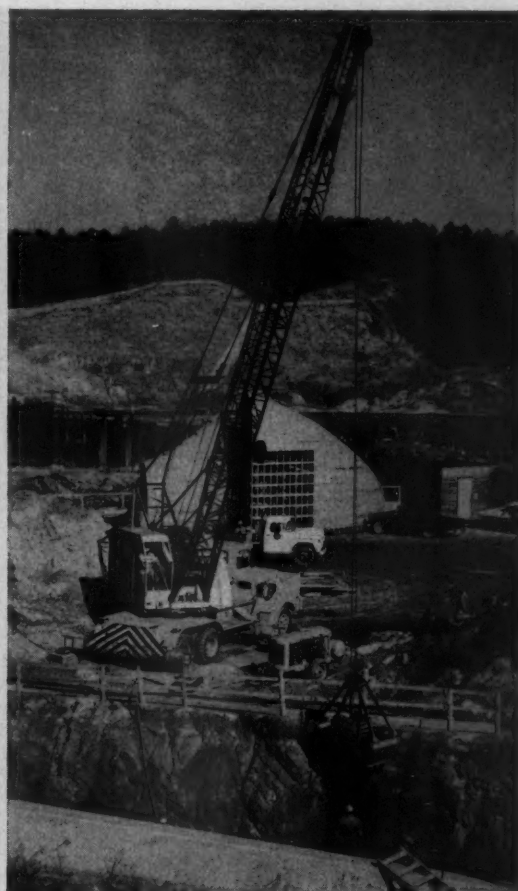
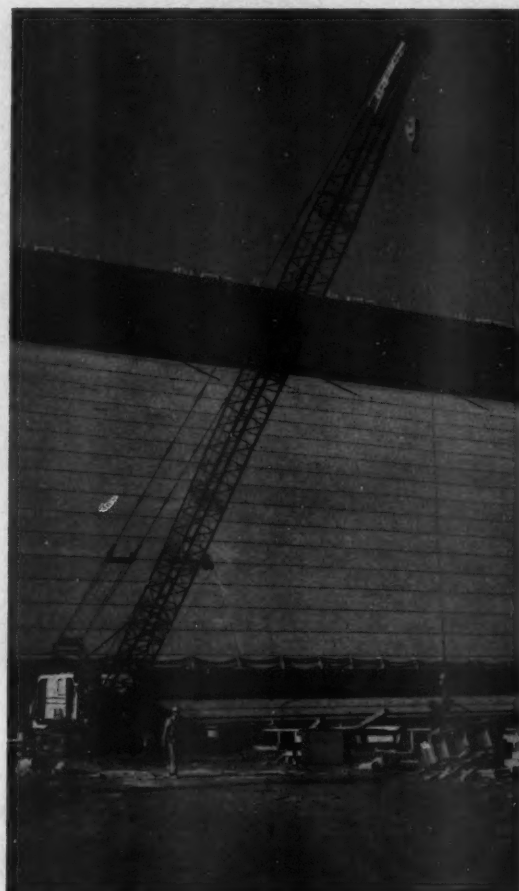
THE END

Why Series 3 lube is recommended oil for diesel engines

Most, but not all, equipment owners
know that Series 3 oil is the crank-
case lubricant recommended for all
diesel engines. It's possible to get by
with a lower-grade oil on some non-
turbocharged engines, but the chance
is not worth taking, says the service
department of International Har-
vester Co.'s Construction Equipment
Division.

Before 1930, oils were rated accord-
ing to viscosity only. Quality was de-
pendent on the price the customer
paid and, more importantly, on the
integrity of the supplier.

In 1945, regular, premium, and
heavy-duty ratings, based on oil per-
formance, were developed. It was re-
cognized that more specific classifica-
tions were needed to meet the per-
formance potential of the high-output
gasoline and diesel engines appear-
ing, and the American Petroleum
Institute, in 1952, established the ML,
MM, MS, DG, and DS classifications,



Johnson, Drake & Piper pick AMERICANS for Hartwell Dam project

50-ton crawler and 30-ton truck
crane handle erection and excavating
work on \$5.3 million powerhouse

JD&P ranks among the biggest contractor firms in the country.
How did they get where they are? They'll tell you sharp equip-
ment buying had a lot to do with it. The fact that they are long-
standing users of AMERICAN cranes and excavators speaks
for itself. And as you look around, you'll find this true of more
and more of today's successful contractors... large and small.

Behind this acceptance is AMERICAN's completely modern
design. There's nothing in an AMERICAN that's a warm-over
of "yesterday's" engineering. That's why AMERICAN gives
you such a perfect balance of power, weight, and strength. And
that, in a few words, is the answer to AMERICAN's superior
day-in, day-out performance.

Take a long, hard look at the way crane values have changed
over the years. We're convinced you'll say AMERICAN has
it... all the way.

CC-724

EXCAVATORS
1/2 to 4 1/2 yds.

CRANES
12 1/2 to 110 tons

DERRICKS-HOISTS
to 800 tons

REVOLVER CRANES
to 400 tons

FORGED FITTINGS
FOR WIRE ROPE
AND CHAIN
(Crosby-Laughlin Div.)

AMERICAN
AMERICAN HOIST
and DERRICK COMPANY
ST. PAUL 7, MINNESOTA

For more facts use Request Card and circle No. 280

ENGINEERS

NOVEMBER, 1961

55

Maintenance Dept.

(Continued from preceding page)

which still are in use. DM, the latest designation, was added in 1958.

These designations are based on a scale of engine operating conditions and do not specify the additive content or quality of the oil. It is left to the discretion of the oil supplier to brand his oil by the correct classification.

The military, however, decided that even more strict regulation was necessary for oils designated for heavy-duty service, and developed its own classification based on actual per-

formance.

Under this system, the MS designation acquired the Mil label, as did the DG listing. DM became Sup. 1, and DS is known as Series 3.

In the lower API classifications (ML and MM), only a few of the seven basic types of additives are found. The seven are: antifoam agents, corrosion and rust inhibitors, oxidation inhibitors, antiwear agents, detergents (dispersants), pour depressants, and viscosity improvers.

The ML designation may be straight mineral oil, although in some

cases a small amount of antiwear agent is used. The MM oils essentially contain only corrosion and oxidation inhibitors. In some instances, a slight concentration of a detergent additive and an antiwear agent are included.

The other classes—MS (Mil), DG (Mil), DM (Sup. 1) and DS (Series 3)—contain all the additives in general use. The main difference between types is the additive percentage.

Relative detergency rating of the classes is:

ML-1 MM-1 to 2 MS-3
DG-5 DM-7 DS-16

Series 3 or DS oil, it will be seen, contains more than twice the additives of the next ranking oil.

Most suppliers use their best quality, most perfectly refined oil as a base for Series 3. This explains its slightly higher price.

Why detergent oils for a high-performance diesel?

Modern diesels have extremely high firing pressures and temperatures. This causes ordinary oil to break down and form carbon and varnish deposits on such parts as cylinder heads and pistons.

MARVEL SYNCLINAL FILTERS

FOR DEPENDABLE PROTECTION on all Hydraulic and other low pressure circulating systems

Designed to give more ACTIVE filtering area—MORE dependable protection—MORE productive operation before cleaning is necessary. Meet J.I.C. Standards.



Synclinal SUMP TYPE

CAPACITIES: 5-8-10-20-30-50-75 and 100 G.P.M.

PIPE SIZES: 1/2"-1"-1 1/2"-2"-2 1/2" and 3".

CONNECTIONS: Coupling—Male Nipple.

BY-PASS VALVE: Not Available.



Synclinal LINE TYPE

CAPACITIES: 5-8-10-20-30-50-75 and 100 G.P.M.

PIPE SIZES: 1/2"-1"-1 1/2"-2"-2 1/2" and 3".

CONNECTIONS: Coupling—Male Nipple.

OPERATING PRESSURES: Up to 80 p.s.i.



Bonded SUMP TYPE

CAPACITIES: 10-20-30-50 and 75 G.P.M.

PIPE SIZES: 1"-1 1/2"-2"-2 1/2" and 3".

CONNECTIONS: Coupling—"O" Ring—Male Nipple.

BY-PASS VALVE: Available with or without



Bonded LINE TYPE

CAPACITIES: 10-20-30-50 and 75 G.P.M.

PIPE SIZES: 1"-1 1/2"-2"-2 1/2" and 3".

BY-PASS VALVE: Available with or without.

OPERATING PRESSURE: Up to 250 p.s.i.

OPERATING TEMPERATURES up to 300° F.



Tandem SUMP TYPE

CAPACITIES: 10-18-20-40-60-100-150 and 200 G.P.M.

PIPE SIZES: 1/2"-1"-1 1/2"-2"-2 1/2" and 3".

CONNECTIONS: Coupling—Male Nipple.

BY-PASS VALVE: Not available.



IN-LINE FILTER

CAPACITIES: Up to 60 G.P.M.

PIPE SIZES: 1/2"-1"-1 1/2" and 1 1/2" (at both Inlet and Outlet).

BY-PASS VALVE: Available with or without

FILTERING MEDIA in all Marvel Filters is Monel wire cloth available in mesh sizes of 30-40-50-60-80-100-150 and 200 to meet your filtration requirement. **EASY TO CLEAN**—All Marvel Filters are easy to clean. Line type units operate in any position and may be serviced without disturbing pipe connections. **OVER 900 O. E. M.'s** install Marvel Filters as Standard Equipment.

IMMEDIATE DELIVERY For further information on a specific type filter—Write—wire or phone

MARVEL ENGINEERING COMPANY

7227 N. Hamlin Ave., Chicago 45, Ill.

Phone: JU niper 8-6023



Please send me information on Marvel Filters as indicated:				CE-11
<input type="checkbox"/> Hydraulic Oils	<input type="checkbox"/> Coolants	<input type="checkbox"/> Lubricants	<input type="checkbox"/> Fire Resistant Fluids	
<input type="checkbox"/> Water	<input type="checkbox"/> Sump Type	<input type="checkbox"/> Line Type	<input type="checkbox"/> In-Line	
Name _____				
Company _____				
Address _____				
City _____ State _____				

For more facts, use coupon.



Pedestrian overpass, Des Moines Freeway, Des Moines, Iowa. Contractor: Cramer & Bayse Construction Company. Engineers: Howard, Hendrix, Tamm and Bergendoff, in conjunction with the Iowa State Highway Commission.



COST-SAVERS in any structure

SONOCO
Sonotube®
FIBRE FORMS
for round concrete columns

Do it better... faster... for less. That's not just a motto, it's a necessity in today's construction industry. And for round concrete columns, SONOTUBE Fibre Forms are the time-saving, labor-saving, money-saving answer!

These one-piece, one-time-use forms eliminate many "normal" delays of concrete construction. There's no fabrication or assembly, no dismantling, cleaning, re-oiling or return-shipping. And, SONOTUBE Fibre Forms can be easily placed, braced, poured and stripped by semi-skilled labor.

There's a SONOTUBE Fibre Form to meet any job requirement and save contractors money in a dozen ways: "A" Coated—standard form for exposed columns; Seamless—for finished columns; "W" Coated—for unfinished or unexposed columns; Encasement Forms—for encasing existing members with concrete; and Special—for use in water or excessive dampness. Order sizes 6" to 48" I.D., standard 18' lengths or specified lengths.

See our catalog in Sweet's
For complete information and prices, write

SONOCO
Construction Products

SONOCO PRODUCTS COMPANY, WARTSVILLE, S. C. • La Puente, Calif. • Fremont, Calif. • Montclair, N. J. • Akron, Indiana • Longview, Texas • Atlanta, Ga. • Ravenna, Ohio • MEXICO: Mexico City • CANADA: Brantford, Ont.

For more facts use Request Card and circle No. 281

CONTRACTORS AND ENGINEERS

Maintenance Dept.

A Series 3 oil has the detergent dispersants to wash these deposits away from critical parts and keep them suspended in the oil until they are collected by filters. Diesel fuels hold more corrosive sulphur than gasoline, and Series 3 oil has the corrosion and rust inhibitors to render this potent chemical harmless.

Not to be overlooked is the fact that a diesel engine produces a gallon of water for every gallon of fuel burned. Rust inhibitors help prevent permanent damage.

Proper lubrication extends engine life; here are pointers

Engine life depends upon proper lubrication. Detroit Diesel Engine Division of General Motors suggests these pointers for effective lubricating procedure:

Check your engine's oil level daily, with the engine at operating temperature and stopped. It is recommended that 5 minutes elapse after the engine is stopped to allow the drainage of oil from the various passages within the engine to the crankcase. The oil level, if low, should be brought to the full mark on the dipstick.

The engine lubricating oil should be changed every 100 hours of engine operation. This interval may be gradually increased if indicated by analysis of the drained lubricating oil.

The changing of the oil requires the renewing of the oil-filter elements, which if retained would contaminate the fresh oil supply. Also, the oil flow is restricted (with full-flow filters) by the material retained in the used oil-filter element.

Always install a new housing-to-shell gasket when changing oil-filter elements. The re-use of the filter housing-to-shell gasket may result in oil leakage.

Detroit Diesel recommends the checking of the engine oil temperature every 1,000 operating hours. If the oil temperature exceeds the engine coolant temperature by more than 50 degrees F and other conditions are normal, the oil cooler may be plugged. An oil cooler that is plugged should be removed from the engine and reverse-flushed with trichloroethylene.

Be sure to fill the cooler element with the cleaning solution, or fuel oil, to prevent hardening of the sludge within the core until it can be cleaned. The exterior of the core can be cleaned with a solution of ½ pound caustic acid to each 3½ gallons of solution composed of ½ muriatic acid and 2/3 water.

Pressure-check the oil-cooler core after it has been cleaned. A simple test plate should be fabricated and attached to the oil-cooler core. An air hose should be attached to introduce approximately 75 psi into the element. The core and plate assembly are then submerged in a container of

water and checked for air bubbles. If a leak is indicated, the core should be discarded. Oil-cooler cores that are found satisfactory should be thoroughly flushed on the exterior and interior with hot water and then dipped in light oil for rust protection.

Should metal particles be observed in the oil-cooler core, the core should be removed and a new core installed. Action should also be taken to locate the source of the particles and corrections made before the engine is placed back into service.

Lubricant types? Don't mix 'em!

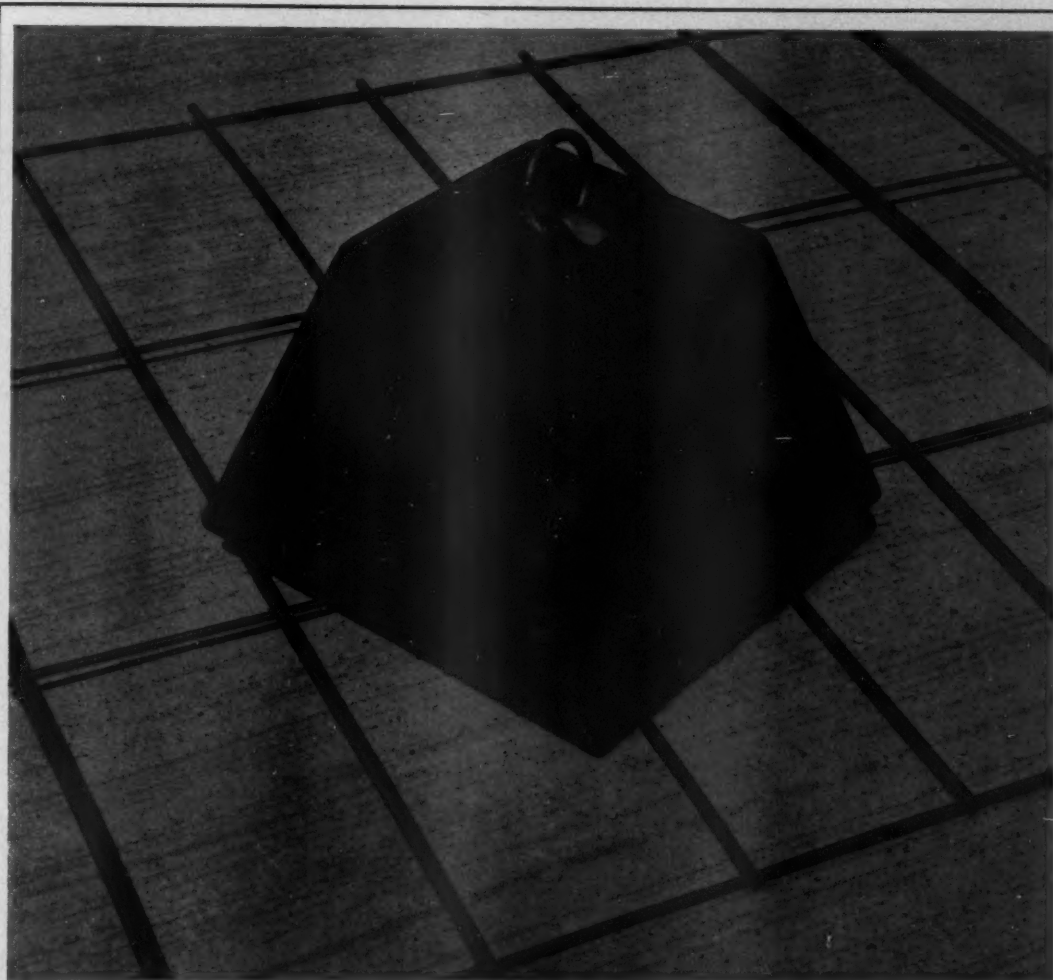
Some lubricants have a lithium base; some sodium. Willys Motors offers this suggestion for lubricating universal joints and wheel bearings.

When sodium-base and lithium-base lubricants are mixed, the result is a thinned-out mixture that can bleed through seals. Lubricants with the same base as that used in the factory before delivery should be used in servicing.

Should oil leaks occur at wheel

bearings, front-axle universal joints, or propeller-shaft universal joints, the leaks may be caused by a mixture of the two types of lubricants. The old lubricant should be removed before new is added.

Wheel bearings should be thoroughly cleaned, lubricated, and re-installed. Front-axle universal joints should be completely drained and filled with new lubricant. The lubricant in propeller-shaft universal joints can usually be replaced by adding new lubricant until all the old lubricant is removed. THE END



Heavy loads shorten concrete road life...

CF&I Welded Wire Fabric lengthens it

In modern concrete highways, reinforcement with welded wire fabric is important. Without it, major arteries don't stand up well against pounding tires and heavy loads.

When embedded in concrete, CF&I Welded Wire Fabric serves as a steel backbone that literally holds highways together. It cushions the impact of heavy, fast-moving vehicles by distributing load stresses and minimizing crack-

ing. And these are the things that make the difference between long, trouble-free road life and expensive maintenance operations.

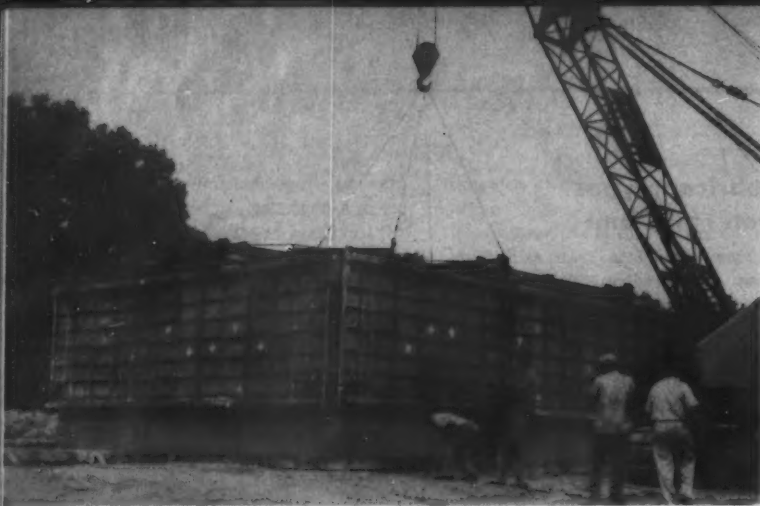
Put CF&I Welded Wire Fabric to work in your roads. It meets all ASTM specifications and is available in a wide range of gages and spacings to meet virtually every type of reinforcing requirement. Call your nearby CF&I sales office for complete details.



THE COLORADO FUEL AND IRON CORPORATION

Denver • Oakland • New York
Sales Offices in Key Cities

For more facts use Request Card and circle No. 232



A complete forming system for casting a concrete house in one operation is about to be lifted by a P&H crane at a housing development near Baltimore. The unit, of Symons forms, has about 5,000 square feet of surface.



Hinges connect the side forms with filler panels and permit them to be swung out for insertion of windows and door bucks.



Another form of corner brace bridges angle irons. Jacks between the lower side of the irons and the top of the wale at the base "pop" forms for stripping.



Carroll Martin, president of Monowall and developer of the concrete-casting method, points to steel casters below the bottom wale that permit forms to swing out.

One form stays intact

A method of casting a concrete house in one operation—not only outside walls but interior partitions and closets—then moving the forming panels as a unit, without breaking up the 18-ton assembly, has been developed by Monowall Homes, Inc., Baltimore. Using a tracked crane, the contractor simply lifts the whole form off the completed building, moves it to the next foundation slab, and begins again.

The development is remarkable in

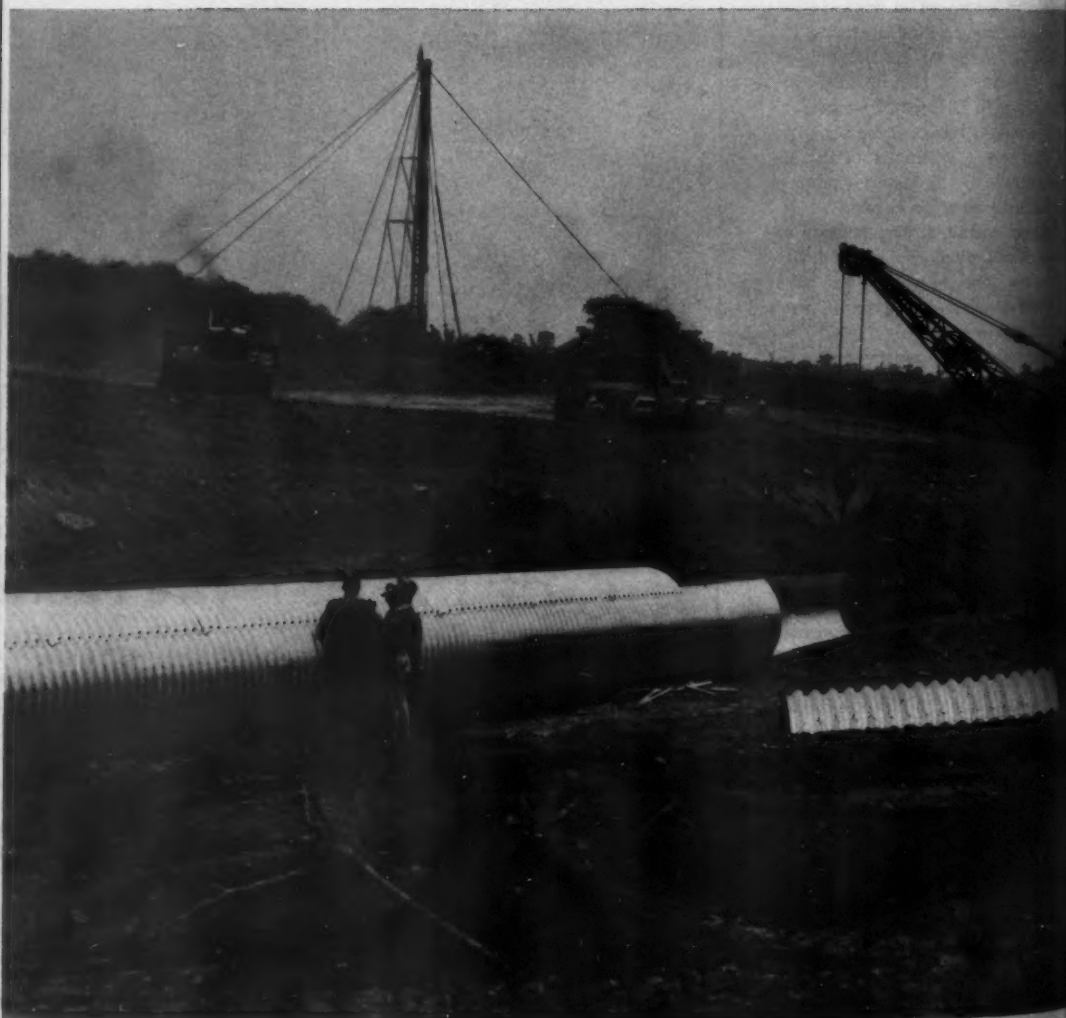
that it suggests the possibility of using standard plywood-faced form panels in any sizes and shapes required for mass housing work, especially in tropical areas where concrete construction is an accepted practice.

Special mix

Part of the answer as to how the job is done is an extraordinarily strong mix (½-inch slag aggregate and more than 70 gallons of water per

... they're building a "runway" and

This 840-ft. installation of 60" USS AmBRIDGE Sectional Plate pipe culvert is being built beneath the runway at the Washington, Pa. Airport. It will drain a stream that runs through a ravine under the landing strip. Workmen aren't wasting a bit of time putting it in. All they do is smooth the grade line, lower the plates into place, bolt them together and backfill. Nobody sits around waiting out expensive curing time and nobody had to put up or tear down forms.



ao mold 200 houses

cubic yard) used by Monowall. A special chemical additive is used with this, and the resulting concrete will bond to almost anything. It needs no dowels to connect with floor slabs, and has proved out at more than 2,000 psi in 28 days. Carroll C. Martin, president of Monowall, developed the additive, which he calls M-52.

The watery mix makes it possible for all concrete to be placed by transit-mix trucks stationed on ramps at only one spot. No vibration or other

mechanical compaction is required.

Martin, who acts as his own job superintendent, started a 200-home development project on a 55-acre tract near Dorsey, Md., using Symons wall form panels in the conventional manner, disassembling after each use. Because of mounting costs and lack of skilled labor, he sought some way of making a permanent form for the whole house that could be used again and again. Here's how he does it:

Starting with an assembly for one house, Martin braces the outside wall forms with wales at the top and bottom of the 8-foot-high panels. Then he inserts four 3/4-inch bolts through holes drilled in the steel angle-iron stiffeners, two near the top and two near the bottom, pulling them up tight with nuts.

The bottom wale on the form assembly for the inside of the walls has an added feature: 2 1/2-inch-diameter steel casters, so that the whole as-

sembly can swing out like a hinged door for the insertion of windows, door bucks, and other items.

The outside corners of the forms are connected with standard corner pieces. However, all inside corners are connected with brass hinges welded to the end panel of the assembly, and to a filler panel that can swing behind the connecting form to make a tight corner and permit the wall sections to be opened.

Angle irons are welded to the inside form assemblies at several points for various purposes. For example: at all corners, to provide anchors for diagonal crosspieces that provide rigidity in lifting and during pouring; and about 2 feet above the bottom of the form, to provide purchase for jacks used in stripping operations.

The form panels are also cut at several places for various purposes. Three-inch plugs are cut from the lower part of the four outside corners and replaced with steel jacking plates, against which hand-operated hydraulic jacks can "pop" the forms away from the finished wall; other plugs are cut in inside forms for insertion of switch boxes and other electrical and mechanical devices.

Flat hooked steel straps are provided to slip into keyways in the angle irons along the edges of the opposing forms, to hold them away from the finished wall after stripping and to keep the form assembly together during lifting.

The lifting rig

To hold this form assembly together during the single lift, the contractor developed a system of overhead beams, a unique clamping device, and a set of jack-assisted steel lally columns. With this rig his crane can make a 4-point pickup of the whole 18-ton assembly, without strain on any section.

The lifting assembly is based on four crossed 8-inch steel I-beams, the two longest—the length of the house—being 42 feet, the cross members 26 feet. Welded together in a criss-cross pattern, these beams are additionally braced by a 1-inch steel bar welded to the top of the two longer members. The main beams pick up the outside wall forms; additional 4-inch steel angles, where required, pick up the interior walls.

The whole form, held by the crane, is moved with the aid of a job-built pickup assembly of rollers and angle irons. This consists of four 3-inch angle irons welded to a plate on the bottom of the pickup beam, with the angles projecting downward to form two "tracks." On these tracks ride trolleys made of two 3-inch steel rollers connected with an axle that is pierced by a threaded rod projecting downward. These rods are then connected by bolts to standard Symons

ay" under the airport

Sectional plates are strong. They won't crack or break. They are highly corrosion-resistant because they are fabricated from tough copper-bearing steel, corrugated and zinc coated. They are available in a complete range of sizes and meet all federal and state specifications. Solve your drainage problems with American Bridge Highway products. Contact one of our offices for literature and information.

USS and AmBridge are registered trademarks

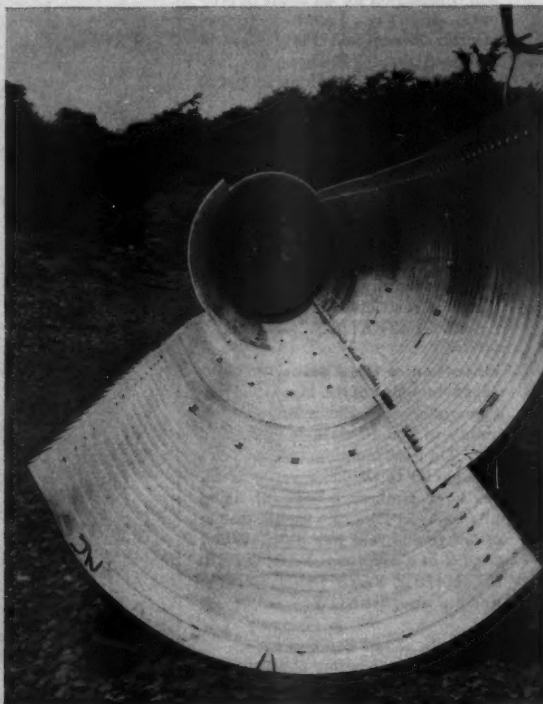


American Bridge Division of United States Steel

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Many hours of installation time are saved because USS AmBridge Sectional Plates can be easily bolted together.



USS AmBridge Sectional Plates are heavily galvanized for long life. Some have been in the ground for 30 years and still look almost new.

With a crane lowers a USS AmBridge Sectional Plate culvert into place. Backfilling will complete the installation.

Contractor—Indyle Construction Co., Houston, Pa.



This mark tells you a product is made of modern, dependable Steel.

For more facts, use Request Card and circle No. 283



Outside wall forms are popped away from the concrete by jacks inserted in this special rig welded to the back of the form panels. Jacks push against a plug sunk in the form and "pop" the form outward.

(Continued from preceding page)

clamps, which fit over the edges of the form panels for the lift. The whole assembly is about 3 feet long.

The 4-inch-diameter steel lally columns are actually two columns, one slipped over the other, with a hydraulic-actuated jack attached to the lower section. The columns are welded to hinged plates on the underside of the pickup beams, and can be locked at any desired height by the insertion of plugs. They support the assembly during placing and stripping and can be swung out of the way when the panels are opened for insertion of wall elements and reinforcing mesh.

When the form has been completely set up on the previously prepared 4-

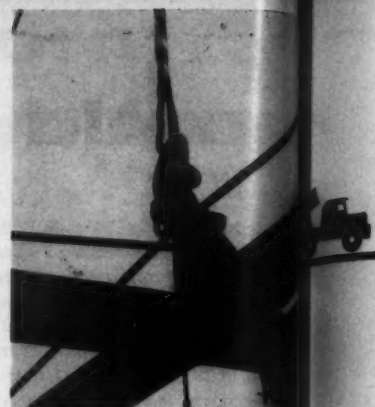
inch foundation slab, the concrete is poured from trucks in as little as two hours. Within about eight hours, the walls are ready for stripping.

Re-usable form ties—the only non-standard items used—are first removed. These are tapered steel pieces with slots for the insertion of standard keys to tie them to the forms. They are oiled before insertion. A pry-bar, inserted in the keyway, snatches them out of the finished wall with comparative ease.

Stripping is done by applying pressure with jacks on the plugs in the outside wall forms, and by jacking them between the bottom wale and the angle irons on inside forms.

With the panels free of the finished walls, workmen move them an inch or two, release the hinge pins where necessary, and connect the opposing panels to hooked steel pieces slipped through slots in the panel edges. The lally columns are used to lift the assembly enough to permit these operations.

After all the panels have been freed and are held by the temporary connections, a crane moves in, lifts the whole assembly, and moves it to the next foundation, about 100 feet. Once it is placed, workmen have only to open the inner panels on their hinges, insert the doors and windows and other attachments, oil the inner



The pickup assembly is hooked to the upper flange of the form stiffener, consisting of angle irons welded to tracks for steel trolleys that are used to carry the clamps.

surfaces, close up, re-insert ties and mesh, and pour.

The finished house is a one-story 24 x 40-foot structure with three bedrooms, bath, kitchen, dining area, and living room; a carport and utility room are added outside the main building. Outside walls are 6 inches thick; interior partitions about 1 inches. Exteriors are finished with a "skim coat" of colored concrete; for variety some houses have one-brick veneer up to window-sill height. The roof is of asphalt shingles over conventional wood trusses. **THE EN**

WHEN CONSTRUCTION JOBS CALL FOR SOIL COMPACTION

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When You're Figuring For The "Low Bid"—No other tool can give you the economy and dependability offered by Barco Rammers on high degree soil compaction for all kinds of projects—Highways, Freeways, Hydro-electric Power and Flood Control Dams, Airports, Bridges, Defense Sites, Buildings, and Housing Developments!

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For more facts, use coupon or Request Card and circle No. 284



How dependable are Wisconsin Engines? The dust-caked 37-hp VG4D shown powering the concrete saw provides the answer.

Note that the crust of abrasive cuttings on the engine is undisturbed. This suggests miles of concrete runways sawed without down-time or costly repairs. Also, the Wisconsin is precision-built to minimize wear and up-

keep in severe applications. Stellite-faced exhaust valves and seats and positive rotators spare you the delays and expense of up to four ordinary valve jobs! With Wisconsins, main bearing failure is almost unheard of.

Provide for your profit by powering your equipment with Wisconsin Engines—now 3 to 60 hp. Get Bulletin S-283. Write Dept. C-21.



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World's Largest Builders of Heavy-Duty Air-Cooled Engines

For more facts, use Request Card and circle No. 285

CONTRACTORS AND ENGINEERS

Product Parade

For further information on the products described in this section, circle the designated number on the Request Card.



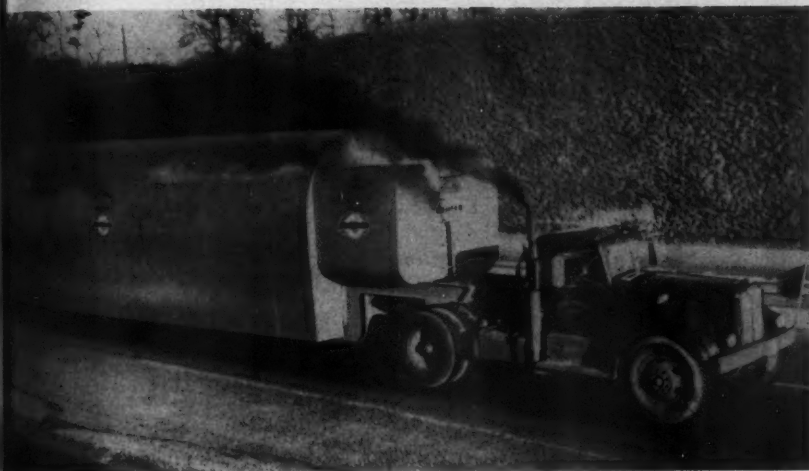
Add 1 3/4-yard unit to tractor-shovel line

Full hydraulic power steering and oil-cooled power brakes are features of Allis-Chalmers' new 1 3/4-cubic-yard capacity HD-7G tractor shovel.

Powered by a 100-hp turbocharged diesel, the machine's torque-converter performance is combined with a new, single-lever power-shift transmission designed to allow the operator to pre-set any working travel speed to match job conditions. Working speeds range up to 5.9 mph forward and to 4.2 mph in reverse.

A wide variety of quick-mounted front attachments is available.

Allis-Chalmers Mfg. Co., Construction Machinery Division, Dept. C&E, Box 512, Milwaukee 1, Wis. Circle No. 90 on Request Card.



Eight new models in materials-heater line

The Industrial Boiler Co., Inc., announces eight new asphalt models in its Chattanooga materials-heater line.

All models reportedly supply hot asphalt within one hour or less after starting, and maintain full capacity thereafter.

Four new A-T models are completely self-contained and mobile. They feature asphalt storage ranging from 10,000 to 25,000 gallons in 5,000-gallon increments.

The A-S models are skid-mounted package units featuring asphalt storage ranging from 10,000 gallons on the 110 A-S model to 25,000 gallons on the 125 A-S, again in 5,000-gallon increments.

Industrial Boiler Co., Inc., Dept. C&E, P. O. Box 9126, Chattanooga, Tenn. Circle No. 57 on Request Card.

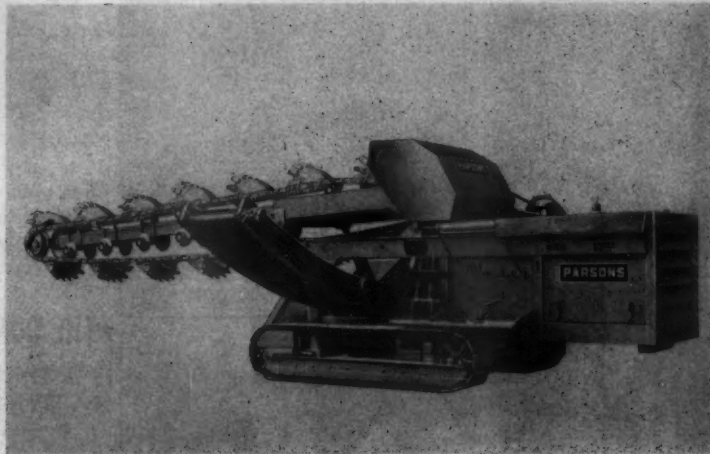
Ladder-type trencher has low silhouette

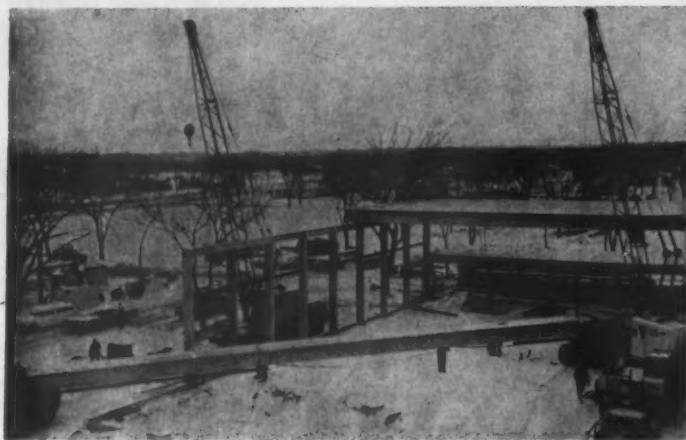
A ladder-type Trenchliner for cutting an 18 to 48-inch trench up to 15 feet deep is offered by the Parsons Co.

Designated Model 255, the machine features a low silhouette with only 9-foot 2-inch height and 7-foot 10-inch width outside the crawlers.

Other features include hydraulic actuation of steering and bucket-line clutches to permit quick response to depth variations and to hold close grade tolerances; and fast, smooth steering.

Parsons Co., division of Koehring Co., Dept. C&E, Box 431, Newton, Iowa. Circle No. 10 on Request Card.





A precast 100-foot-long single-tee beam is brought into place during the construction of the Bryan Junior High School, Elmhurst, Ill. This structure employed precast members throughout, and construction continued throughout the winter with no delays. Manufacturer of the prestressed members was Crest Concrete Systems, Dept. C&E, P. O. Box 328, Lemont, Ill. Circle No. 125 on Request Card.

HANDLE THE TOUGHEST PUMPING JOBS WITH EASE!

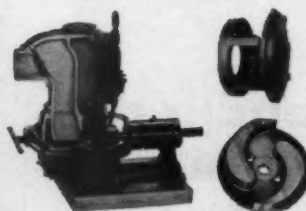


Gorman-Rupp EXTRA HEAVY DUTY Pumps for Contractors

Completion dates... equipment failure... bad weather... water problems... headaches that harass as you push to get the job done. You just can't afford to have trouble.

Dependability takes on its full meaning when these rugged Gorman-Rupp Pumps are on the job. Simple design, rugged construction—and the performance, even under brutal treatment, is completely reliable. You know you can keep the toughest jobs going with these extra heavy duty units.

See these pumps at your Gorman-Rupp Distributor. They're built to serve you for years.



Fast-Action End Plate—Exclusive Design. Releases for access to impeller and renewable wearplate. Two-vane open impeller handles solids.

160 GPM MODEL 12B2



350 GPM MODEL 13A2



600 GPM MODEL 14A2



1400 GPM MODEL 16A2



THE GORMAN-RUPP COMPANY

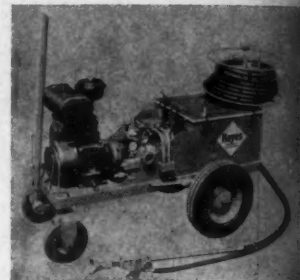
305 BOWMAN STREET • MANSFIELD, OHIO
GORMAN-RUPP OF CANADA, LIMITED
ST. THOMAS, ONTARIO

For more facts, use Request Card and circle No. 236

Portable power sprayer for maintenance cleaning

The Hayes Spray Gun Co. announces a portable, all-purpose, heavy-duty power sprayer, the Jet 500.

Designed for high-pressure maintenance cleaning of construction machinery, this new power sprayer re-



quires only one man for operation and can be prepared for use in a few minutes.

The Jet 500 has no water tank—external water sources are used—and is so designed that no chemical passes through the water pump. As clear water is discharged from the pump, a vacuum is created in an external mixing chamber that siphons the chemical from the concentrate tank mounted on the chassis. Water and chemical are automatically mixed and proportioned in the exact ratio specified and carried to the nozzle for discharge, the manufacturer states.

Compactly made, the unit is powered by a 7-hp gasoline engine.

Hayes Spray Gun Co., Dept. C&E, Pasadena, Calif. Circle No. 19 on Request Card.

Announce new curing, hardening compound

W. R. Meadows, Inc., announces Sealtight Cure-Hard, a compound designed to cure, chemically harden, seal, and dustproof concrete in one operation.

Sealtight Cure-Hard is quickly and easily applied with either a spray or hair broom. According to the manufacturer, it resists sticking of mortar and concrete drippings, and resists the penetration of oils and chemicals.

W. R. Meadows, Inc., Dept. C&E, 26 Kimball St., Elgin, Ill. Circle No. 85 on Request Card.

CONTRACTORS AND ENGINEERS

Ask the man who
changes the points!

...no one makes
a tougher tooth
than ESCO

The earth moving industry
looks to



The right design, the right steel, the right
shape make *ESCO* Two Piece Teeth right
for every digging condition.

ESCO Corporation

PORTLAND, OREGON and DANVILLE, ILLINOIS

See reverse for shapes and size range ➤

Here are
the points to
remember...



Each easy-to-change ESCO Point is Brinell tested to assure exact the right degree of shock-absorbing toughness and abrasion resisting hardness for longer life. Abrasion resistant Wear Cap (illustrated) extend adapter life.

12M ALLOY STEEL

ESCO 12M Two Piece Teeth are the toughest you can use. Developed through years of research for the earth moving industry, cast ESCO 12M is the finest steel made for severe shock and abrasion.

ESCO TWO PIECE TEETH for all your digging equipment

Your ESCO dealer can supply two piece teeth for all your equipment. Consult him about standardizing on ESCO teeth for the added advantages of quantity purchasing and reduction of on-the-job inventories.



8 POINT TYPES FOR EVERY DIGGING CONDITION



WEAR CAP ADAPTERS

The ESCO Wear Cap Adapter, winner of the Blue Ribbon Mining Award, is the most rugged tooth assembly ever developed for handling tough rock and taconite. Replaceable wear caps sharply increase service life by protecting the adapter from wear. No special pins or welding required.

ESCO Corporation

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LITHO IN U.S.A.

Versatility is featured in new concrete finisher

Engineered Equipment, Inc., announces the True-Line concrete finisher. Originally designed for use as a bridge-deck finisher, this unit has been adapted to handle small paving jobs, and with accessories can be used as a curb-forming machine.

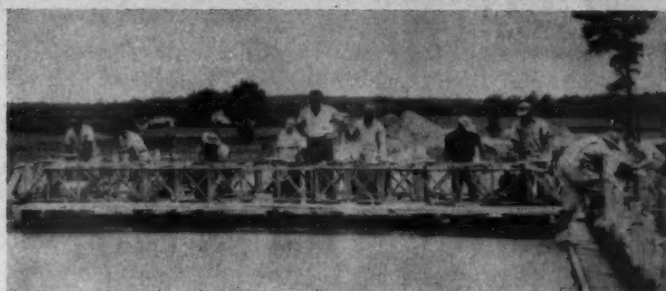
It utilizes dual oscillating screeds to minimize any side movement of the machine. Finishing tolerances can be held within $\frac{1}{8}$ inch in 10 feet, and, under normal conditions,

no hand finishing is required.

The unit is gasoline-engine driven, and is available in various sections to span any width from 12 to 44 feet.

The finisher is offered with self-propulsion or hand-powered winches. Truss length is easily adjustable, and individual screeds can be inserted to meet specific requirements.

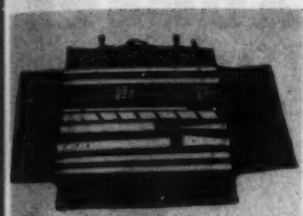
Engineered Equipment, Inc., Dept. C&E, 1001 Linden Ave., Waterloo, Iowa. Circle No. 62 on Request Card.



The True-Line finisher is designed to span any width from 12 to 44 feet, and individual screeds can be inserted to meet specific needs.

Soil-exploration kit for depths to 20 feet

A soil-exploration kit, said to be handy and efficient in recovering samples of practically any material except rock, is available from the Penn-drill Division of the Pennsylvania Drilling Co.

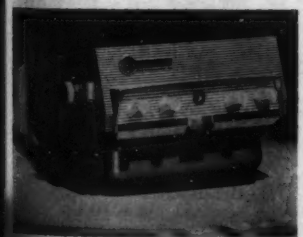


The kit is designed for hand operation, and is contained in a metal box or optional canvas tool-rolls for ease in transporting. It contains a variety of soil-sampling tools and sufficient extension rods to sample to depths of 20 feet.

Pennsylvania Drilling Co., Penn-drill Mfg. Div., Dept. C&E, 1205 Charliers Ave., Pittsburgh 20, Pa. Circle No. 126 on Request Card.

Offer new two-way, two-frequency radio

General Electric's Communication Products Dept. announces a mobile, 2-way, transistorized radio designed to provide dual-frequency listening through a common receiver, minimiz-



ing extra battery drain.

The equipment is designed to transmit on the FCC-assigned frequency or frequencies in high band, 130 to 174 mc, or low band, 25 to 50 mc. It can monitor "cross-band," listening to a high-band and a low-band channel.

Both dash-mount and trunk units are available.

General Electric Communication Products Dept., Dept. C&E, P. O. Box 1077, Lynchburg, Va. Circle No. 81 on Request Card.



NOTHING DIGS TRENCH LIKE A TRENCHER.

ACCURATE - PRODUCTIVE - EFFICIENT and

TOUGH

In digging like this no other excavator compares in productivity with a modern wheel-type trencher. Take a second look at that spoil bank. That's hard shale and rock-digging, right down to trench bottom. Piling up that spoil at a 4-foot-a-minute clip is a tough Cleveland J-40.

There are fundamental reasons why full-crawler, wheel-type trenchers like this—the trencher originated and perfected by Cleveland—are unequalled for trench production in hard digging.

The wheel is the strongest type of digging element and the stability of the full-crawler mounting permits maximum exploitation of its digging ability in continuous digging action. Simultaneous wheel rotation

and crawler progress result in constant forward crowd of the wheel into the work with maximum utilization of power at the point of digging.

Higher wheel-speeds in relation to crawler-travel produce a fast-biting milling action that is most effective for digging shale, frost and similar conditions. Slower wheel-speeds produce powerful bites that forcefully chew out caliche, hardpan, coral and other hard formations. The continuous-digging, crawler-mounted, wheel-type trencher digs trench in all such conditions faster and more economically than excavators dependent on interrupted-cycle digging action.

Investigate now the profit potential of a modern trencher—a tough, fast, dependable Cleveland Trencher.



**CLEVELAND
TRENCHER**

THE CLEVELAND TRENCHER CO., 20100 ST. CLAIR AVE., CLEVELAND 17, OHIO



Featuring unit construction for fast field assembly or disassembly, the Lima Madsen Model 581 has a batch capacity of 5 tons.

New asphalt plant rated at 300 tph

A new 10,000-pound-batch-capacity asphalt plant is announced by Baldwin-Lima-Hamilton Corp.

Named Lima Madsen Model 581, the plant is rated at 300 tph at a 60-second charge-mix-discharge cycle.

This plant is available with full automatic controls for cold aggregate feed, dryer-burner firing, and tower batching. Controls are designed to let the operator work at ground level where truck loading and traffic can be observed. Actual plant operation can be maintained by two persons.

Mix specifications reportedly can be changed from truck to truck without loss in cycle time. Four or 5-compartment storage bins with up to 100-ton storage capacity for hot aggregate assure adequate material availability. Segregation of material is minimized, and level loading of the weigh box is provided by triple bin-gate openings.

Baldwin-Lima-Hamilton Corp., Construction Equipment Division, Dept. C&E, Lima, Ohio. Circle No. 73 on Request Card.

New sealant locks vibrator assemblies

A sealant designed to prevent the loosening of parts in concrete vibrators is available from the American Sealants Co.

Called Loctite, it comes ready to use without mixing, and is applied directly from the bottle.

American Sealants Co., Dept. C&E, 705 N. Mountain Road, Newington, Conn. Circle No. 37 on Request Card.

... drill through hardest masonry at high speed

Reduce Job Costs with ...

HOFFMAN

Diamond
MASONRY
CORE BITS

Drill right through hardest reinforced concrete, tile, asphalt, etc. Cut holes to exact size on first pass. From 1" to 14" dia. Hoffman Bits are Diamond Impregnated or Surface Set ... fit any machine ... assure fast, easy installation of conduit, piping, air-conditioning units, etc.



Hoffman Bits drill 1" to 2" deep per minute on modern equipment like this new "Roto-Kor" Drilling Machine.

Kor-It Model 600 Machine swivels full 360° for any angle drilling of 1" to 5 1/2" dia. holes.

Write for Literature and Prices—FREE. Ask for Information on Hoffman Diamond Segmented Circular Saws for cutting concrete, granite, etc.

HOFFMAN BROS. DRILLING CO.
BOX 426, PUNXSUTAWNEY, PA.

For more facts, use Request Card and circle No. 289

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address _____ city _____ zone _____ state _____

For more facts, use coupon or Request Card and circle no. 290

Flame-cutting machine is lightweight, versatile

A 19-pound flame-cutting machine, the Model CM-75 Cadet, has been introduced by the Linde Co. Fast, clean cuts in metals ranging from light-gauge sheet to 2-inch-thick reportedly can be made with the new machine.

Because it is equipped with a chain, it is suitable for hand-guided cut-out cutting, the manufacturer states.

In addition to its complete portability, the new machine is said to be versatile and easy to operate.

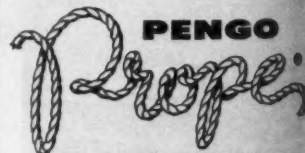
Linde Co., division of Union Carbide Corp., Dept. C&E, 270 Park Ave., New York 17, N. Y. Circle No. 127 on Request Card.

PENGO AUGERS

Save you money
4 ways



- 1 **BORE FASTER...** put real "teeth" in earth drilling, save wear and tear on your diggers.
- 2 **STAY ON THE JOB LONGER** ... all wearing parts replaceable in the field; no down-time for shop welding.
- 3 **COST FAR LESS TO MAINTAIN** ... reversible teeth cost only 90¢ each, pilot bit only \$8.00. Parts interchangeable on all PENGO augers you are using ... less inventory!
- 4 **A SIZE AND TYPE FOR EVERY BORING JOB** ... Augers and boring heads (for welding to your present auger) available for every make of machine from post hole diggers to largest heavy-duty earth drills. Write for catalog.



—the most satisfactory construction rope available today!

- * **GREAT STRENGTH**
(8,200 lbs. for 3/4" diameter)
- * **LIGHT WEIGHT**
(11 lbs. per 100 ft. 3/4" diameter)
- * **HANDLES AND SPLICES LIKE MANILA**
in any climate or weather
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(even salt water); can't mildew or rot. Excellent dielectric properties.

PENGO-Rope is a synthetic rope of special construction available in all popular diameters from 3/8" to 2"; regular construction in sizes smaller than 3/8". Write for specifications, prices.

PETERSEN
ENGINEERING COMPANY, INC.
Santa Clara, California
AXMINSTER 6-7713

For more facts, circle No. 291

CONTRACTORS AND ENGINEERS



Massey-Ferguson's new diesel tractors, the 203 and 205, reportedly develop 40 horsepower. Shown here is the MF 205 equipped with 15-foot-capacity loader.

Gas-fired heater is versatile unit

A new 65,000-Btu per hour gas-fired portable heater, called Heat-Master, Jr., is offered by ThermoDynamics, Inc.

Operating on natural or LP gases, the unit reportedly can be run for extended periods of time without attention to fuel-tank refilling. Because gas heat is virtually odorless and carbon-free, venting to the outside is necessary only as an added safety factor for personnel in confined areas.

Models are available with three different gas controls. A limit switch

in the forced-air blower automatically turns it off in the event of a flame-out.

The principal uses for the Heat-Master, Jr., are "spot" heating outdoors, circulated heat inside, and drying and thawing of construction materials. However, removal of the directional delivery hood and blower—by loosening four thumbscrews—converts the unit to a radiant space heater.

ThermoDynamics, Inc., Dept. C&E, Englewood, Colo. Circle No. 17 on Request Card.

Two new tractors are diesel-powered

Diesel engine power is now available on two new models of Massey-Ferguson tractors.

These models, the 203 and 205 series, are both powered by a 152-cubic-inch, 3-cylinder diesel engine said to develop 40 horsepower. At a governed maximum speed of 2,000 rpm, the engine reportedly can absorb substantial loads down to a speed of 1,300 rpm before it is necessary to change into a lower gear.

The new 205 model is equipped with instant reverse and torque converter.

Massey-Ferguson, Inc., Dept. C&E, 1009 S. West St., Wichita 13, Kans. Circle No. 128 on Request Card.

New electric vibrator for light-duty work

The Cleveland Vibrator Co. announces the Model MC-2 electric vibrator for use on small bins, chutes, and hoppers.

Designed for continuous or intermittent service on light-duty applications, this unit features an external mechanical air-gap adjustment that changes vibration intensity with the turn of a bolt. The manufacturer states that this will vary intensity of vibration at a frequency of 3,600 vibrations per minute.

The cast-aluminum body of the MC-2 attaches with two cast feet that eliminate the need for a special mounting base. A sheet-steel cover protects the vibrator mechanism, and is ventilated and screened to prevent the entry of dust and dirt.

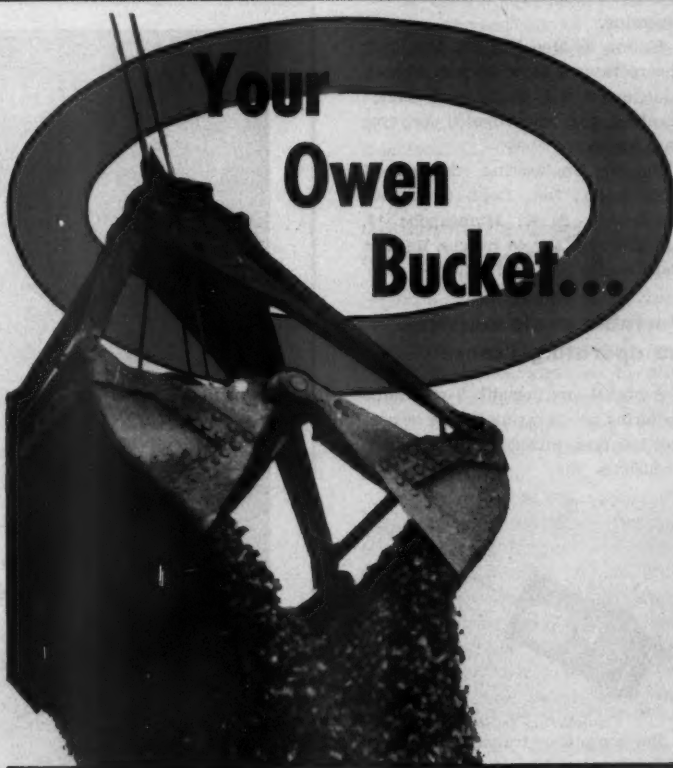
Cleveland Vibrator Co., Dept. C&E, 2828 Clinton Ave., Cleveland 13, Ohio. Circle No. 14 on Request Card.

Add new model to engine-primer line

The Start Pilot Corp. announces a new engine-starting primer, the Model 962.

This capsule-type primer is said to permit two to three starts per fuel capsule, depending on the size and type of the engine.

Start Pilot Corp., Dept. C&E, 199 E. Second St., Mineola, N. Y. Circle No. 58 on Request Card.



Will Never Owe You Anything!

Your OWEN Clamshell Bucket starts making money for you from the first hefty mouthful it bites off . . . and keeps on making money because its rugged construction "stands up". It's the bucket with "The Big Bite that's Just Right!"

The OWEN has a strong appetite for work—an appetite that is never satisfied. These are exclusive features that keep it working for you:

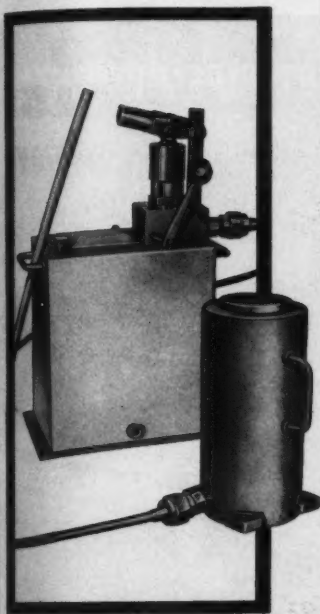
- Block and Tackle Type Reeving
- Recessed Lips
- One-piece Head Construction
- Single Main Shaft
- Riveted Bowl Assembly

Prompt service through ample inventory on new equipment and parts.

Write for OWEN information on how these features can make money for you.

The **OWEN**
BUCKET COMPANY
BREAKWATER AVENUE • CLEVELAND 2, OHIO
BRANCH OFFICES: New York • Philadelphia • Chicago • Berkeley, California • Fort Lauderdale, Florida

For more facts, use Request Card and circle No. 293



hydraulic pumps and jacks

Because the pump is a separate unit, connected by flexible tubing, Farrel Watson-Stillman hydraulic jacks will give you safe lifts in hard-to-reach spots. What's more, this arrangement divides the total weight, making portability easier.

Ranging in capacities from 20 to 1000 tons, there's a jack for every type of construction requirement, including pre-stressed concrete application. Hand, air or electric-driven pumps come in single or double plunger types with stainless-steel bodies and bronze pump chambers.

FARREL-BIRMINGHAM COMPANY, INC.
WATSON-STILLMAN PRESS DIVISION
565 Blossom Road, Rochester 10, N. Y.
Plants: Ansonia and Derby, Conn.,
Buffalo and Rochester, N. Y.

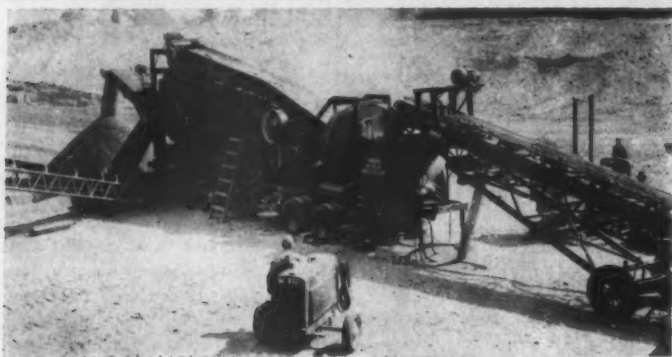


FREE BOOKLET gives full details and specifications. Send for bulletin 242-S.

WS-86

For more facts, circle No. 292

NOVEMBER, 1961



Crushing plant features jaw and cone crusher

A portable duplex crushing plant designed to utilize a jaw and cone crusher is announced by Pioneer Engineering.

Known as Model 36-CE, the plant incorporates a 15 x 36 jaw, 36-inch cone, and 5 x 14-foot 3-deck screen, together with 36-inch-wide conveyor throughout.

Pioneer Engineering, division of Poor & Co., Inc., Dept. C&E, 3200 Como Ave. S. E., Minneapolis 14, Minn. Circle No. 48 on the Request Card bound into this issue.

Portable radio requires no operating license

A pocket-size portable 2-way radio requiring no operating license or permit has been introduced by Polytran Industries, Inc.



The completely transistorized radio transmitter and receiver, designated the Model CT-200, operates in pairs or with existing mobile and base equipment. Power is supplied from standard 9-volt dry batteries or rechargeable nickel-cadmium batteries.

Polytran Industries, Inc., Dept. C&E, 1010 Howard Ave., San Mateo, Calif. Circle No. 129 on Request Card.

New folding barricade is compact, portable

Peterson Bros., Inc., announces a new, portable emergency-utility barricade designed for easy portability, storage, and fast erection.

Called the Gator Guard, the unit expands from its folded dimension of 11 3/4 inches to full 9 feet 7 inches, and stands 39 1/2 inches high.

The company points out that the two scissoring sections can be pivoted to a 90-degree angle around a vertical stabilizing rod located in the center of the barricade, thus forming a two-sided barricade with 4-foot 9 1/2-inch sides.

Peterson Bros., Inc., Dept. C&E, P. O. Box 51, Station G, Jacksonville 6, Fla. Circle No. 130 on Request Card.

The Pioneer Model 36-E crushing plant, featuring jaw and cone crusher, is being fed rock by a mechanical feeder carried on a portable field conveyor.

Chemical process cures, seals, hardens concrete

A special formula giving 3-way protection to concrete is announced by Chem-Search, Inc.

Called Tri-Kote, the treatment is said to cure, seal, and harden freshly placed concrete and to protect existing concrete surfaces. It is a one-application process, and penetrates up to 1/8 inch, becoming an integral part of the concrete surface.

The manufacturer states that the treatment reduces maintenance by repelling salts, oils, greases, alkalis,

mild acids, and water. It is also said to reduce dusting and flaking and to stop hairline crazing.

Tri-Kote can be applied immediately upon completion of troweling, and is compatible with adhesives, joint sealants, and cement grout. It reportedly eliminates the need for wet burlap paper, curing membranes, and sealing and hardening agents.

Chem-Search, Inc., Dept. C&E, 239 Taft St. N.E., Minneapolis, Minn. Circle No. 131 on Request Card.



Problem: Because outdated bridge is used regularly by heavy logging trucks, bridge requires monthly inspection, frequent maintenance.

Best way to "modernize" old bridges!

Why fight an endless battle to maintain old bridges? Especially when you can replace these "budget eaters" with low-cost Wheeling Corrugated Metal Culvert Pipe. Just look at the advantages it has!

Resistance to shock and vibration—Unlike concrete pipe, Wheeling Corrugated Culvert Pipe is flexible. So it absorbs the severe shock caused by shifting fill and heavy trucks.

Amazing strength—This same flexibility makes Wheeling Culvert Pipe far stronger, because it enables the pipe to "borrow" strength from the surrounding earth (see for yourself

by conducting this simple test with your garden hose).

Won't disjoint—Wheeling Culvert Pipe adjusts to the pressures created by shifting fill because it has beam strength... Wheeling Culvert Connecting Bands grip both pipe ends securely.

Special end treatments—Never a problem! You always get fast, economical service on special end treatments including skews and bevels, from your nearby Wheeling Culvert Plant.

WHEELING CORRUGATING COMPANY

Warehouses: Boston, Buffalo, Chicago, Columbus, Detroit, Kansas City, Louisville, Minneapolis, New York, P.

CONTRACTORS AND ENGINEERS

This 6,000-pound-capacity lift truck, the Model F-60, is one of seven new trucks announced by Allis-Chalmers Mfg. Co. The new series provides capacities ranging up to 10,000 pounds. Features include new engine, mast, forks and carriage, and power steering as standard equipment. Allis-Chalmers Mfg. Co., Dept. C&E, Box 512, Milwaukee, Wis. Circle No. 44 on Request Card.



Offer slow-down device for compressor engines

An automatic slow-down device for gasoline engines used on air compressors is announced by the Champion Pneumatic Machinery Co.

This pneumatic control operates during the unloading cycle. A pilot switch and unloader valve actuate the control. During the pumping cycle, the pilot switch channels the tank pressure to the diaphragm of the unloader valve, holding it closed so that the air will be forced into the tank. At the same time, the pressure is piped to the pneumatic throttle control that overrides the engine governor and opens the throttle.

This control is available as optional equipment on all Champion 2-stage, gasoline-powered air compressors.

Champion Pneumatic Machinery Co., Dept. C&E, 825 N. Pleasant St., Princeton, Ill. Circle No. 8 on Request Card.

Danish-made drills for masonry drilling

Danish Import offers Joran carbide-tipped masonry drills for concrete, brick, and other masonry materials. They are available in drill diameter sizes from 1/4 inch through 1 inch; over-all lengths from 3 to 20 inches; and shank diameter sizes from 3/8 to 1/2 inch.

The grooves in the flutes are specially designed to aid in the removal of dust and particles to avoid clogging and overheating of the drill. The use of special alloys and hardening methods gives maximum strength to the drill body, according to the manufacturer, and all Joran masonry drills are nickel-plated for protection against corrosion.

Danish Import, Dept. C&E, Box 101, Birmingham, Mich. Circle No. 15 on Request Card.

Horn and flasher device signals backup warning

The Dynalert automatic backup warning horn, designed for rolling and track-type vehicles, is announced by Atkinson Dynamics.

Dynalert may be used for both audio and visual warnings by the addition of a red flasher, offered as an accessory, and actuated by the Dynalert unit.

Atkinson Dynamics, Dept. C&E, 10 W. Orange Ave., South San Francisco, Calif. Circle No. 38 on Request Card.



Wheeling Large Diameter Corrugated Metal Culvert Pipe easily handles peak stream flow . . . absorbs shock created by logging trucks.

Special finishes—For corrosive or abrasive situations, Wheeling supplies special finishes, including full and partial bituminous coatings with or without paved inverts.

Always get fast delivery on Wheeling Culvert Pipe and Fittings because Wheeling maintains special culvert plants at Des Moines, Detroit, Havana, Ind., Jeffersonville, Ind., Kansas City,

Madison, Wis., Martins Ferry, Ohio, Minneapolis, Philadelphia, St. Louis.

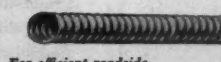
Get the whole story on Wheeling Corrugated Metal Culvert Pipe (both copper-bearing steel and copper-bearing pure iron) from your Wheeling man this week. Or write directly to Wheeling Corrugating Company, Wheeling, West Virginia.



WHEELING CULVERT PIPE HERE, TOO!



When headroom is limited, use standard side-bored Wheeling Pipe Arch.



For efficient roadside drainage, use Wheeling Small Diameter Culvert Pipe.



For deep, fast-flowing streams, use Wheeling Large Diameter Culvert Pipe.



For deep, shifting fill, use Wheeling Large or Small Diameter Culvert Pipe.

WHEELING STEEL!

New York, Philadelphia, Richmond, St. Louis. Sales Offices: Atlanta, New Orleans, Houston.

For more facts, use Request Card and circle No. 294





Building up Seawall at Baltimore Marine Terminal.
Contractor: Empire Construction Co., Baltimore

Symons Steel-Ply Forms Used in Tight Quarters

Three 6-foot high-walls, each 1200 feet long, with an additional 200 feet curved section at the outer end had to be formed within a working space of 39 feet. The only bracing required was the double 2 x 4 walers at the top and bottom of the forms. Sections were easily handled by one workman. Symons Forms are rented with purchase option. Symons Clamp & Mfg. Co., 4251 Diversey Avenue, Dept. L-1, Chicago 39, Illinois.

For more facts, use Request Card and circle No. 295

Product Parade—These Products Can Help Widen Your Profit Margin



The new Warner & Swasey boom, interchangeable with Hopto 200 hydraulic backhoes, incorporates all of the firm's Gradall boom actions.

New telescoping boom for hydraulic backhoe

A new telescoping boom with Gradall result of all actions, interchangeable with the Hopto 200 hydraulic backhoe, has been developed by the Warner & Swasey Co.

Called the Gradall Hydro-Scop, the unit is designed specifically for the cleaning and maintenance of existing ditches or preparation of new roadside drainage ditches. Interchange of booms is simple, involving only the withdrawal of two pins and the quick disconnection of six hoses to remove the boom.

The Warner & Swasey Co., Dept. C&E, 1124 W. 5th St., Winona, Minn. Circle No. 132 on Request Card.

New rear tractor tire for on or off highway

A new rear tractor tire, designed for agricultural-type tractors used in construction operations, is offered by the B. F. Goodrich Tire Co.

According to the manufacturer, the tire has wider, more massive cleats than the conventional farm-tractor tire while retaining the conventional tire's self-cleaning tread design. This gives the new tire increased wear when used on hard surfaces and ample traction in soft dirt or mud, the company states. It is said to be suitable for a variety of uses, on and off the highway, and is especially recommended for tractors equipped with mounted equipment such as backhoes, trenchers, and lift loaders.

B. F. Goodrich Co., Dept. C&E, 500 S. Main St., Akron, Ohio. Circle No. 94 on Request Card.

Automatic paver system controls mat thickness

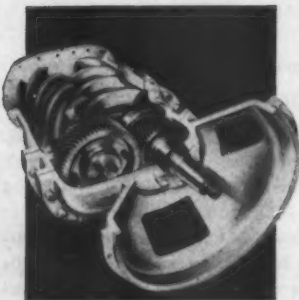
A new all-electric depth-slope control system said to enable paving contractors to lay uniformly even and smooth mat automatically, regardless of irregularities in the subgrade, has been developed by the Iowa Mfg. Co. in conjunction with Minneapolis-Honeywell.

The purpose of the new Electro-matic screed controller system is to provide accurate control of mat depth or thickness, as well as a precise slope angle for the crown of the road. One



FILLS THE MEDIUM CAPACITY GAP!

ANOTHER NEW ROTA-SCREW PORTABLE READY FOR YOUR FLEET

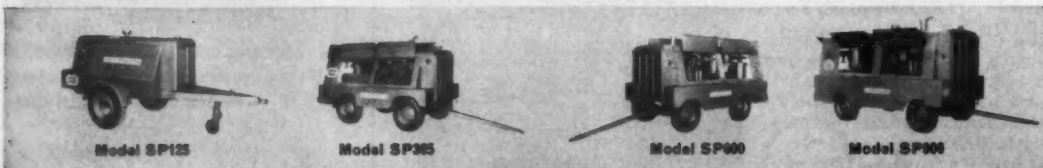


Here's cost-saving news for your medium-sized jobs. All the cost-cutting advantages . . . which Gardner-Denver Rota-Screw portables are now demonstrating on construction projects from coast to coast . . . are now available to you in a new model that delivers 365 cfm.

There's nothing to wear out in the air compression chamber . . . no contact between running parts.

No vanes to inspect or replace • Single-stage simplicity • Instant compressed air • Automatic blowdown.

See your Gardner-Denver distributor . . . or write for details on Rota-Screw portables in capacities of 125 . . . 365 . . . 600 . . . 900 cfm.



EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER - DENVER

Gardner-Denver Company, Quincy, Ill.—Offices in principal U.S., Canadian and Mexican cities in Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Ave., Toronto 16, Ontario International: Gardner-Denver International Division, 233 Broadway, New York 7, N.Y. Offices: Buenos Aires, Argentina; Artarmon, N.S.W., Australia; Brussels, Belgium; Rio de Janeiro, Brazil; Santiago, Chile; Barranquilla, Colombia; Lima, Peru; Ndola, N. Rhodesia; Salisbury, S. Rhodesia; Johannesburg, Transvaal

For more facts, use Request Card and circle No. 296



A Cedarapids paver with the new Electromatic screed controller at work. The control system enables road builders to lay a smooth mat automatically.

result of its use, the company points out, is to permit high-speed paving with no necessity to tear up and re-lay unacceptable bumpy stretches. The first course, reportedly, can be laid to an even elevation over the roughest subgrade, while the amount of mix required for laying the second course can be predetermined, allowing the contractor to make an exact cost estimate.

Setting the Electromatic control is simple. Using the control knobs, the operator dials slope and grade corrections; snaps two switches to "automatic," and the Electromatic takes over.

The new screed control, developed for Cedarapids pavers, is available as optional equipment with new machines, or it may easily be retro-fitted on Cedarapids units now in use.

Iowa Mfg. Co., Dept. C&E, 916 16th St. N. E., Cedar Rapids, Iowa. Circle No. 74 on Request Card.

New blasting agent obtains high velocity

A new high-density blasting agent that obtains a high velocity is announced by the Austin Powder Co.



Called Austinite 30, it has a density of 1.2 and a speed of 14,000 feet per second. Priming can be accomplished by the use of Austin ACP primers or regular dynamites and gelatins.

The higher density and velocity of Austinite 30 are said to permit wider spacing of blast holes or the use of smaller quantity of blasting agent, where conditions suggest this.

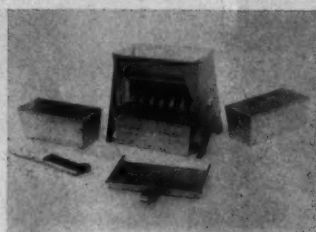
Austin Powder Co., Dept. C&E, 450 Rockefeller Bldg., Cleveland 13, Ohio. Circle No. 70 on Request Card.

Improved sample splitter is simple to operate

An improved stainless-steel sample splitter for dividing or halving dry materials such as soil, sand, cement, and gravel has been announced by Solltest, Inc. It is used in preparing large mass materials into quantities small enough for testing.

The splitter is simple to operate. Materials poured into the hopper are automatically divided into two equal portions by a series of stainless-steel chutes. The chutes discharge the material alternately in opposite directions into separate pans.

The Solltest sample splitter is available in five chute widths: 1/2,



3/4, 1, 2, and 2 1/2-inch. Special sizes can be made to order. The splitters are supplied complete with scoop and brush.

Solltest, Inc., Dept. C&E, 4711 W. North Ave., Chicago 39, Ill. Circle No. 16 on the Request Card that is bound into this issue.



ALL "SHOOK UP" DECIDING ON AN AIR COMPRESSOR?

Take "Hardrock Smitty's" advice and **GO SMITH!**

There's a complete line of Smith compressors ranging in size from 45 cfm to 125 cfm in both portable and stationary models. The Smith compressor is designed and built to deliver years of trouble free service under all conditions.

- low initial cost
- low operating cost
- easy maintenance
- simple, compact design
- quick starting
- single stage compression

Compare price . . . compare job results you'll go Smith!

SMITH

AIR COMPRESSORS

GORDON SMITH & COMPANY, INC., Bowling Green, Ky.

Ask your dealer for an "on the job" demonstration. (write us for complete information and the name of your nearest dealer)

For more facts, use Request Card and circle No. 297

for a look at a complete line of...

Platform Trailers

check first with **TRAILMOBILE**

Trailmobile offers you a complete line of platform trailers for distributed or concentrated loads. Interchangeable side panels also available for conversion to open top trailers. A variety of financing plans to meet your conditions. Sales and service branches in fifty-four cities. For complete information, call the Trailmobile office nearest you or use the coupon.

TRAILMOBILE INC.

Cincinnati 9, Ohio • Springfield, Mo. • Longview, Tex. • Fremont, Calif.

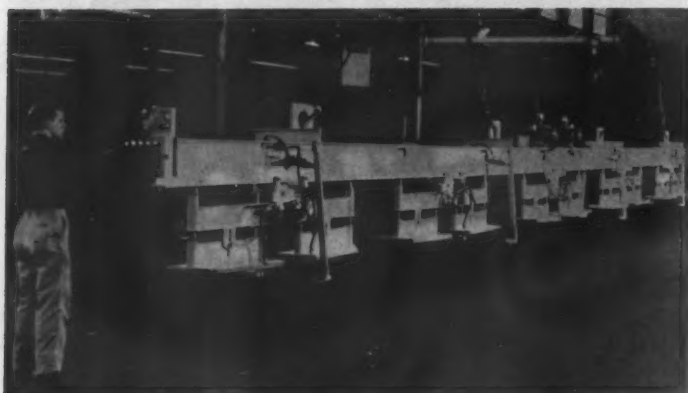
TR-048



Trailmobile Inc., 31st & Robertson, Cincinnati 9, Ohio • Please send folders covering platform trailers.

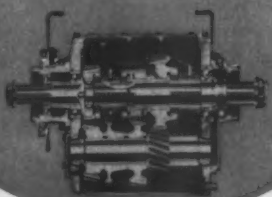
name _____ company _____
address _____ city _____ zone _____ state _____

For more facts, use coupon or Request Card and circle No. 298



Designed to handle up to 54-foot flexcore beams from the mold, the Vac-U-Lift concrete handler features five adjustable subbeams with individual filtrated pads.

- High Capacity
- Low Initial Cost
- Reduced Maintenance
- Flexibility of Ratios



for medium-heavy duty trucks and tractors, specify one of the eight

Fuller '65 Series 3-Speed Auxiliary Transmissions

available from all truck manufacturers upon specification. Top-mounted power take-off optional.

'65 SERIES (Medium-heavy-duty) RATIOS

MODEL	SPLITTER RATIOS		DEEP REDUCTION
	High	Intermediate	
3-A-65	.754	1.00	2.221
3-B-65	.804	1.00	1.239
3-C-65	.754	1.00	1.239
3-D-65	.804	1.00	2.221
3-E-65	.804	1.00	1.74
3-F-65	.754	1.00	1.74
3-G-65	1.00	1.32	2.221
3-H-65	1.00	1.32	1.74

For the right transmission for every operation

Specify  Specify the MODEL FULLER TRANSMISSION DIVISION EATON MANUFACTURING COMPANY KALAMAZOO, MICHIGAN

For more facts, circle No. 299

Vacuum concrete handler lifts 54-foot beams

The Vac-U-Lift Co. announces a 10-ton vacuum concrete handler specially designed to lift up to 54-foot flexcore beams from the mold.

The concrete handler is a self-contained unit with integral wiring and power, complete filtration at each individual pad, five adjustable subbeams, 4-point suspension, and four sets of air-actuated grab arms (optional) to permit handling of forms separately.

According to the manufacturer, this unit is designed for easy one-man operation with complete selectivity of individual subbeams, through a control panel, for smaller material lengths. It features an electrical solenoid release valve for instantaneous vacuum attachment and detachment, red-green visual safety indicator lights, plus a safety reserve system that holds the vacuum even if the power should fail.

Vac-U-Lift Co., division of The Siegler Corp., Dept. C&E, Route 37, Salem, Ill. Circle No. 135 on Request Card.



This vibrating earth borer, available from Remington Arms, boro holes under the frost line of roads to eliminate breaking, underexcavating, and resurfacing. The Model 14 EBW is powered by a gasoline engine, operates at more than 10,000 vpm, and makes a 2-inch-diameter hole up to 28 feet long. The unit features a 360-degree swiveling wheelbarrow mount and one-man operation. Remington Arms Co., Inc., Dept. C&E, 939 Barnum Ave., Bridgeport 2, Conn. Circle No. 148 on Request Card.

Whatever You Haul, You Need a BIRMINGHAM Trailer

Model 1660 FLU—Figure 553A with trunnion axles and walking beam suspension.



BIRMINGHAM lowbed trailers have an international reputation for rugged construction and long, dependable service. We manufacture many standard models and sizes from 15 to 265 tons capacity. These include single axle lowbeds, tandem lowbeds, 3- and 4-axle lowbeds, Totem-All trailers, tilt trailers, dollies, jeep-types, platform trailers, trailer trains, logging trailers, telescopic trailers, and "tailor-made" trailers engineered to meet any special requirements of the buyer. (Write or phone for illustrated catalog)

BIRMINGHAM MANUFACTURING COMPANY, INC.

1st Ave. So. at 55th St. • Birmingham, Alabama
PLATFORMS TOTEM-ALLS LOWBEDS
Phone 595-6183 Cable Address Birmco

For more facts, use Request Card and circle No. 300

HY-LO Now! A COMPLETE LINE OF inexpensive portable heaters!

FORCED-AIR Heater New... Revolutionary!



1/4 THE COST!

Produces 70,000 to 125,000 BTUs per hr. Over 600 cu. ft. of CLEAN HEAT per min.

Only 1/4 the cost of conventional forced-air heaters, yet equal in performance.

LP GAS Heater

Produces more radiant heat! 85,000 BTU output

The HOTTEST LP Heater on the market.



LPs available with Automatic or Manual Controls. (Manual model shown here.)

SALAMANDER

Low cost heat! The most popular Salamander on the market. OUTSELLS ALL OTHERS!



AVAILABLE IN ALL PRINCIPAL CITIES
WRITE FOR FREE LITERATURE AND NAME OF NEAREST DEALER

 PRODUCTS CO. — Heaters since 1911
297 STOWELL STREET, UPLAND, CALIF.

Telephone: YUkon 2-8933

For more facts, use Request Card and circle No. 301

The new stabilizers for the Dynahoe permit it to work on backhoe jobs that were previously inaccessible.

Offer new stabilizer for backhoe operation

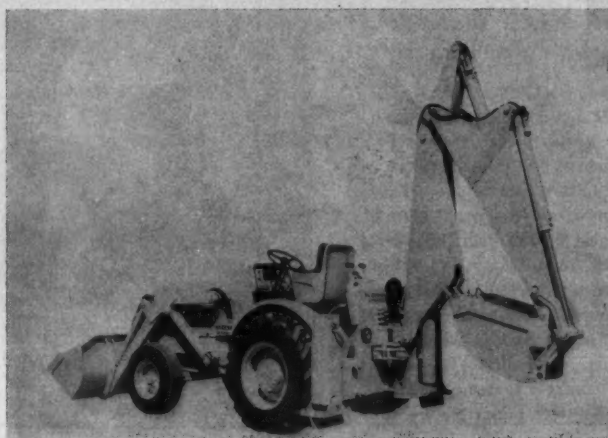
A new type of optional stabilizer for close-quarter work is now available for use on the Dynahoe, the completely integrated loader-tractor-backhoe available from the Hy-Dynamic Co.

The stabilizers operate vertically, providing solid vehicle support during the backhoe operation without requiring any side room beyond the width of the tractor itself. When equipped with the new stabilizers, the Dynahoe can be positioned directly

alongside any building or curb.

These stabilizers are readily interchangeable with the standard set, requiring only the exchange of several pins and the attachment of two hose connectors. They are available with both rubber pads and grousers, which are quickly interchangeable to meet specific job requirements.

Hy-Dynamic Co., Dept. C&E, Skokie Highway, Lake Bluff, Ill. Circle No. 49 on Request Card.



Offer new, versatile photocopy process

A new, versatile photocopy process that yields up to four copies from a single negative is announced by Ampto, Inc., subsidiary of the Anken Chemical & Film Corp.

The process reportedly can be used with any standard copying machine of the diffusion transfer type.

Ampto, Inc., subsidiary of the Anken Chemical & Film Corp., Dept. C&E, Newton, N. J. Circle No. 82 on Request Card.

Mobile, vertical file for engineering drawings

Plan Hold Corp. announces a mobile plan rack, featuring a tubular-steel frame equipped with ball-bearing casters.

This rack can be adjusted to accommodate sheets up to 36 x 48 inches. It is intended for use with Plan Hold Type S binders and provides for filing up to 1,200 sheets.

Plan Hold Corp., Dept. C&E, 5204 Chakemco St., South Gate, Calif. Circle No. 87 on Request Card.

A new name A new drill steel

**Brunner
& Lay's**

DRILLALLOY



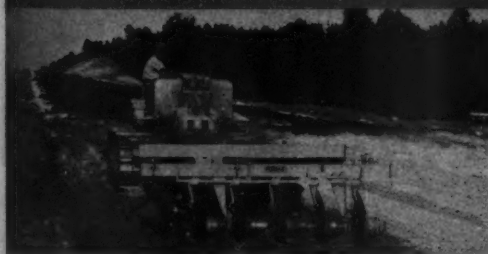
- Our own special analysis 1½" round alloy steel.
 - Large hole for better blowing and cleaning.
 - Shot Peened to insure added fatigue resistance.
 - Uncouple by hand—No wrenches necessary.
 - Specially recommended for use with Rope threads.
 - Rethreadable on the job without heat treatment.
 - A round steel—no corner nicks to cause breakage.
 - Coated with Special Formula Rust Inhibitor.
 - "DRILLALLOY" stamped on every Rod for your protection.
- Call our local dealer, or write us. Brunner & Lay, Inc., 9300 King St., Franklin Park, Ill. Nation wide sales & service.

**Brunner
& Lay**

carbide ROK-BITS, DRILL STEEL, COUPLINGS,
ADAPTERS, STRIKING BARS, HOLE-SAVERS

For more facts, use Request Card and circle No. 302

BUILD HIGHWAYS THE ROME WAY



MIXING AND BLENDING. Rome Model TRCH 10-36 Hinge Type Offset Disk Plowing Harrow cuts up to 13" deep for low cost mixing, blending, bonding lifts.



AERATING. Rome Model TRH 20-30 Hinge Type Offset Disk Plowing Harrow weighs over 9,000 lbs.—heavy duty construction for less maintenance, longer life.



PULVERIZING AND LEVELING. Rome Model TCW 40-94 Wheel Type Offset Disk Plowing Harrow cuts 15' wide—has rubber tire transport for easy turns, transport, accurate depth control.

TOUGH, VERSATILE AND MONEY SAVING. Rome Disk Plowing Harrows are available in many sizes and types. For aerating, mixing, scarifying, pulverizing—there's a ROME for your job, your equipment. See your Rome-Caterpillar dealer.

ROME.

ROME FLOW
COMPANY
Cedartown, Georgia



HEAVY-DUTY LAND CLEARING,
TILLAGE AND
LAND PREPARATION EQUIPMENT

For more facts, use Request Card and circle No. 303

HIGH PRESSURE CLEANING WITH CHAMPION PUMP



KEEPS EQUIPMENT OPERATING AT FULL CAPACITY



...AVOIDS MANY COSTLY REPAIRS ...SAVES LABOR!



Champion Hi-Pressure Water Pumps deliver from 5 to 25 gpm at 500 psi ... nozzle adjusts from jet stream to fine spray with one-quarter turn ... portable or stationary models.

**CHAMPION PNEUMATIC
MACHINERY COMPANY**

PRINCETON 20, ILLINOIS

Please send me data on Champion Hi-Pressure Washers.

Name

Address

City State

For more facts, use coupon or circle No. 304

Concrete mixer features unique tilting mechanism

A new concrete mixer with a special hydraulically operated tilting mechanism is offered in 2, 4, 6, and 7½-yard capacities by Erie Strayer.

The mixer is available as a trailer-mounted unit with its own permanent running gear, or for installation on a permanent foundation; either type is equipped with hydraulic power unit, electric motor drive, charging hopper, and manual controls. Optional equipment, including automatic batching controls to required specifications, water tank, meter, and pumps, is also available.

Rather than pivoting on a central axis as do conventional tilting mixers, the new Erie unit swings up and out over an eccentric path as it tilts. The full 55-degree tilt makes possible the production and discharging of exceptionally low slumps.

Over-all dimensions for the 6-yard trailer-mounted unit are 36 feet long from fifth-wheel kingpin to end, 11 feet wide, and 13 feet 6 inches high. It can be towed easily by a standard truck-tractor to any convenient work site. At full-capacity operation on one-minute mixing cycles, it can produce as much as 236 cubic yards of finished concrete per hour, the manufacturer states.

Erie Strayer Co., Dept. C&E, Rudolph Ave. at Nickel Plate RR, Erie, Pa. Circle No. 84 on Request Card.

Plastic accessories for reinforced concrete

Plastic accessories for reinforced concrete, designed to take the place of steel-slab bolsters or concrete blocks and thus eliminate frequent maintenance caused by bleeding through of rust, are offered by Universal Builders Supply Co., Inc.

Made of high-density polyethylene, the accessories include continuous-slab and beam bolsters, mesh bolsters that snap into place, and plastic "doughnuts" for holding exact clearance between reinforcing bars and form face.

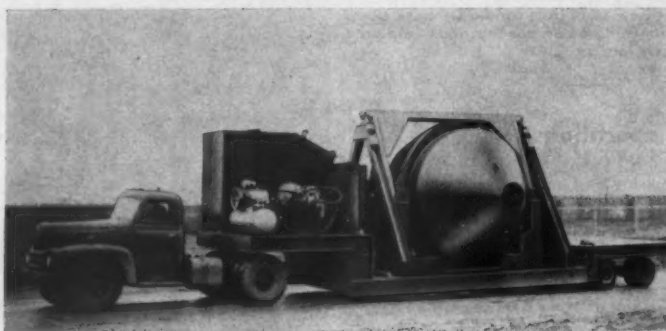
Universal Builders Supply Co., Inc., Dept. C&E, 41 E. 42nd St., New York 17, N. Y. Circle No. 136 on Request Card.

Announce engine option for tractor-dozers

A 170-hp General Motors diesel engine is now available as optional equipment for the Michigan Model 180 tractor-dozers.

Designed to increase the machine's flexibility and production, the new engine is designated Model 6V-53. It features 2-stroke engine cycle, unit injector fuel system, and maximum parts interchangeability.

Clark Equipment Co., Construction Machinery Division, Dept. C&E, P. O. Box 599, Benton Harbor, Mich. Circle No. 100 on Request Card.



The new Erie Strayer mixer has a full 55-degree tilt.

Agglomerated alloy flux for rebuilding parts

The Lincoln Electric Co. announces a new agglomerated alloy flux for submerged-arc fabricating or rebuilding 12 to 15 per cent manganese-steel parts.

Called Lincolnweld M-210 flux, it is said to offer maintenance economies in surfacing or reclaiming manganese or carbon steel parts by reducing material costs and increasing deposition rates and welding speeds.

Practical maintenance applications

NOW...ALLIS-CHALMERS BRINGS YOU

NEW HD 7G FULL POWER STEERING BRAKING SHIFTING

A new combination of full power control—hydraulic steering, braking, and shifting—brings new output capacity and ease of operation to Allis-Chalmers 1¼-yard HD-7G. With a 100-hp turbocharged engine and torque converter drive, there's plenty of smooth, production-boosting power in this outstanding tractor shovel.

Easy! Power steering and power brakes—not only new ease of operation... but reduced maintenance and unusually long-life service as well! The reason—steering clutches and brakes run in a complete oil bath. Runs cool, with minimum brake adjustment, no steering clutch adjustment necessary at all!

Economical! Allis-Chalmers 7000 Turbocharged engine—delivers 100 net hp from a combustion system that has established itself as the most efficient in the industry. Controlled turbulence and open chamber combustion design provide a thorough mixing of air and fuel for fast, even, complete combustion... matchless fuel economy.

Fast work cycles with Power-Shift—The 7G combines smooth torque converter performance with single-lever Power-Shift transmission. You *shift on-the-go*—from any forward speed to any reverse speed, with an infinite number of speeds through the entire working range of up to 5.9 mph forward, up to 4.2 mph reverse.

Stable! Most track in its class—With 7-ft, 1½ in. of track on the ground, 62-in. tread, and 15-in. track shoes, the HD-7G has the extra stability to handle heaped loads with speed and safety... whatever the job, whatever the terrain.

Smooth! Exclusive Ground-Speed-Control—No need to limit your speed by shifting into lower gears. Set your speed automatically with Ground-Speed-Control. If you want the tractor to run at 2 mph, it moves at that speed with or without load, up to full engine power. There is no speed-up when the load is lightened, no slowdown when it is increased. You get smooth operation throughout the work cycle... top production all day long.

STEP UP YOUR



Your Allis-Chalmers dealer will be glad to arrange a full-scale demonstration on your job at your convenience. Allis-Chalmers Construction Machinery Division, Milwaukee 1, Wisconsin.

WITH **ALLIS-CHALMERS**
POWER FOR A GROWING WORLD

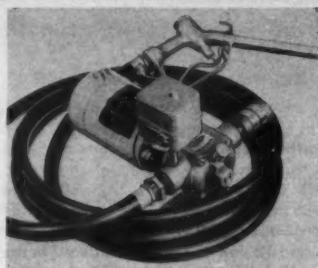
Product Parade—Your Headquarters for Information on New Equipment and Materials

for the new flux include rebuilding worn surfaces prior to application of highly abrasive-resistant materials or surfacing where the deposit itself is subject to wear.

The Lincoln Electric Co., Dept. C&E, Box 3115, Cleveland 17, Ohio. Circle No. 137 on Request Card.

Offer fuel-transfer pump for truck-tender tanks

The Spee-D-Filler, a battery-operated pumping unit for on-the-job refueling of motorized equipment



from a pickup truck, is offered by the Jerome Simer Co.

The self-priming, bronze, 20-gpm

pump has a pressure switch set at 10 to 20 pounds. When the discharge nozzle is opened, delivery starts instantly. When the nozzle is closed, the motor stops, conserving power.

Jerome Simer Co., Dept. C&E, 207 Humboldt Ave. N., Minneapolis 5, Minn. Circle No. 138 on Request Card.

Rubber building sealant survives tough weather

A new silicone-rubber building sealant is offered by the Dow Corning Corp.

Designated Dow Corning 780, the one-part sealant cures quickly to a permanent silicone-rubber seal that will easily survive the most severe weather conditions, according to Dow.

The cured sealant is said to be nonstaining and to remain watertight and rubberlike over a service range of minus 80 to 350 degrees F. Dow Corning 780 is supplied in handy polyethylene cartridges for standard air or hand-operated guns.

Dow Corning Corp., Dept. C&E, Box 592, Midland, Mich. Circle No. 139 on Request Card.

**100 HP
1 3/4 YD**





The portable electric fueling system shown here mounted on a Dodge truck and filling up a Galion grader is available from the Viel Mfg. Co. This unit has a 140-gallon tank that features double valves so that two different fuels are available to the operator; fuel can be pumped at the rate of 15 gpm. These units, designed for both 6 and 12-volt systems, are offered in tank capacities up to 500 gallons. Viel Mfg. Co., Dept. C&E, Box 632, Billings, Mont. Circle No. 140 on Request Card.

It's here! New HEAVY-DUTY STOPMASTER BRAKE



**Biggest News
in Brakes for Off-Highway
Equipment in over 30 years!**

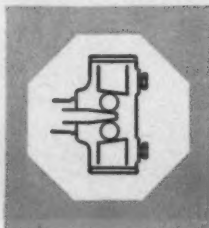


To meet the growing need for more versatile, more compact, more dependable braking equipment in off-highway operations, Rockwell-Standard® now presents a completely new concept in brake design.

This new brake is specifically engineered for use on scrapers, prime movers, earth and rock wagons, dump trucks and similar construction vehicles. Available in 17, 20¼, 22 and 26-inch diameters and in 4 to 10-inch widths.

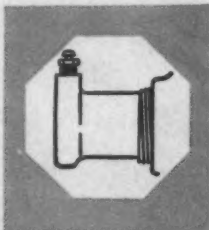
If it's a Stopmaster you get...

- Reduced Operating Cost
- Less Heat Fade
- Greater Interchangeability of parts
- Heavy Duty ¾ inch tapered Econoliners®
- Adjustment frequency reduced
- Rugged Design
- Extended Drum Life



Only the Heavy-Duty Stopmaster offers: "BALANCED DESIGN" AND NEW ACTUATION PRINCIPLE

Results in improved braking performance and lower operating temperatures. In Dual-Actuation design, both shoes do an equal amount of work. Balanced shoe-action assures more dependable service; faster, surer stops.



HYDRAULICALLY OPERATED

New hydraulic cylinders offer more compact design and increased mounting flexibility for better protection. External cylinders, located outside of drum, eliminate heat damage and overheating of fluid. For air-over-hydraulic systems, air volume requirements are considerably less. Actuation time is reduced, with faster response of hydraulic system. The Stopmaster Brake is well suited for straight hydraulic, air-over-hydraulic, or vacuum-over-hydraulic operation.

Another Product of...

**ROCKWELL-STANDARD
CORPORATION**

Brake Division, Ashtabula, Ohio



For more facts, use Request Card and circle No. 506

Portable utility pump rated at 3,300 gph

A multipurpose, portable, engine-driven pump is announced by Peerless Pump.

Designated Pup, this pump has a capacity of 3,300 gph. Powered by a



2½-hp vertical engine, the Pup is ruggedly constructed and features a total weight of 40 pounds.

Its wide-bottom base offers maximum stability during pump operation, according to the manufacturer.

The Peerless Pup has 1¼-inch suction and discharge ports, and varying lengths of pipe are easily attached.

Peerless Pump, Hydrodynamics Division, FMC Corp., Dept. C&E, 381 West Ave. 26, Los Angeles 31, Calif. Circle No. 141 on Request Card that is bound into this issue.

Retractable air-leg unit added to rock-drill line

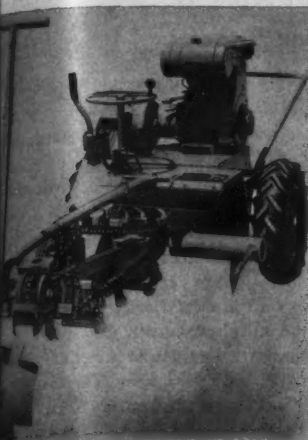
Machinery Center, Inc., announces a 9-foot retractable air leg called the Long Tom.

The unit consists of a balancing air cylinder and an extendable air cylinder. By adjusting a four-way pressure valve which regulates air in the balancing cylinder, air instead of manpower supports the rock drill whether retracted, partially extended, or extended the full 9 feet. The extendable air cylinder maintains the drill point in constant contact with the material being drilled.

By adjusting the air pressure to the balancing cylinder the Long Tom is held at any desired height, and movement up or down is accomplished simply by pushing down or lifting the leg with one hand to the new position.

Machinery Center, Inc., Dept. C&E, 1201 South 6th West, Salt Lake City, Utah. Circle No. 150 on Request Card.

CONTRACTORS AND ENGINEERS



New trencher attachment for foundation footings

A new tee-footing cutter has been developed by The Charles Machine Works, Inc., as an attachment to the Ditch Witch trencher line.

The model pictured can be mounted on any Ditch Witch trencher in the M3 and M4 series, either rubber-tire or crawler-mounted. With this attachment, the user can dig a foundation footing with 8-inch stem and 16-inch tee footing.

For heavier jobs, a 12-inch stem, 24-inch tee-footing cutter, which mounts on the Ditch Witch K2 4-wheel-drive trencher, is available.

Charles Machine Works, Inc., Dept. C&E, 636 B St., Perry, Okla. Circle No. 107 on Request Card.

Offer new electrode for steel welding

A new E7018 iron-powder, low-hydrogen-type electrode for all-position welding of steel is available from the Air Reduction Sales Co.

Called Airco Easyarc 328, it can be used with either ac or dc, reverse polarity. Deposits of exceptional quality and impact strength are obtainable with this electrode, according to the manufacturer.

Airco Easyarc 328 features high-speed deposition, low spatter, and easy slag removal. It is available in 14-inch lengths, and in 3/32, 1/8, 5/32, and 3/16-inch diameters.

Air Reduction Sales Co., division of Air Reduction Co., Inc., Dept. C&E, 180 E. 42nd St., New York 17, N. Y. Circle No. 142 on Request Card.

Traffic lane markers easily stored, carried

New, easily stored and carried traffic safety lane markers are offered by Stokes Molded Products.

Interchangeable yellow tubes set in separate, heavy 10-inch-square molded bases, they are made in lengths of 12 to 72 inches, in increments of 12 inches.

According to the manufacturer, these units will accommodate presently used standard accessory flags, warning signs, or flashing lights.

Stokes Molded Products, Dept. C&E, Taylor St., Trenton, N. J. Circle No. 143 on Request Card.

German diesel imports in five power sizes

International Harvester Co.'s Construction Equipment Division offers small, German-built diesel engines in five power sizes.

The imports are direct-starting, valve-in-head, sleeved engines with 19.1 compression ratios, and range from 15.8 to 39.6 maximum horsepower.

The engines are designed with interchangeable connecting rods, main and connecting rod bearings, valves,

valve springs, push rods, and rocker-arm assembly components.

All models are available from stripped engine to complete power unit. The power-unit hood is hinged to permit easy access to the fuel tank, cooling system, oil pan, and battery. Operating levers and instruments are grouped for easy, one-hand control.

International Harvester Co., Dept. C&E, 180 N. Michigan Ave., Chicago 1, Ill. Circle No. 92 on Request Card.



Largest of the German-made diesels imported by International Harvester.



Galion 160 works hardest where workpower counts most

This husky 160-hp. grader makes full use of more than 30,000 pounds of well-balanced weight to put more "push-power" at the blade—where power counts most in high-output grading.

Its massive one-piece welded frame is built to take the shocks and stresses of hardest working conditions day after day—keeping maintenance costs low.

Standard Galion features—including full floating axles, hydraulic booster steering, heavy-duty constant-mesh transmission and a 12' x 29" moldboard—permit Model 160 operators to do more work each day.



For complete information contact your Galion distributor or write for Bulletin 421.

THE GALION IRON WORKS & MFG. COMPANY, GALION, OHIO, U.S.A.
General and Export Offices, Galion, Ohio, U.S.A.—Cable Address, GALIONIRON, Galion, Ohio

For more facts, use Request Card and circle No. 307



The M-B truck-mounted striper can lay both center lines and edge stripes at the same time by means of two spray-gun carriages that extend on outriggers.

Offer truck-mounted highway line striper

A new truck-mounted highway line striper is announced by the M-B Corp. of New Holstein, Wis.

The unit is equipped with four paint guns, and can lay both center lines and edge stripes at the same time. Center-line stripes may vary in distance from 8½ to 12½ feet from the edge of the roadway. Lines from 4 to 6 inches wide are laid by the spray guns, and paint is carried in two 60-gallon tanks having air-motor-driven paint agitators. The paint-tank compressor is a liquid-cooled rotary type, with 85-cfm delivery.

A skip-line mechanism provides 15

feet of painted line and a 30-foot section. Included is a "return to zero" feature that automatically returns the skip mechanism to the beginning of the painted-line section of the cycle. This device allows the operator to copy or retrace worn paint lines.

Other features of the striper include a large rear platform for dispersing and retrieving line guards, and an electronically powered communication system between the truck driver and the striping operators.

M-B Corp., Dept. C&E, 1635 Wisconsin Ave., New Holstein, Wis. Circle No. 144 on Request Card.

New nylon safety nets withstand heavy impact

Safe-Hi nylon safety nets are available from the Rose Mfg. Co.

These nets are made of 1-inch woven Du Pont nylon webbing having a 3,000-pound tensile strength. According to the manufacturer, they will withstand extremely heavy impact of material, machinery, or personnel.

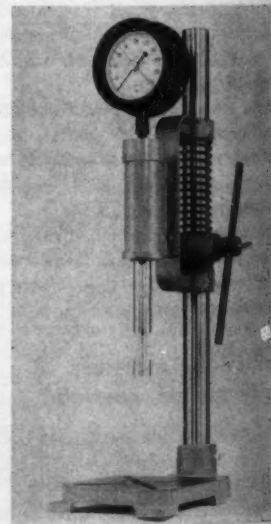
Standard nets are 22 feet square. Any desired length or width may be attained by joining sections together.

Rose Mfg. Co., Dept. C&E, 2700 W. Barberry Place, Denver 4, Colo. Circle No. 60 on Request Card.

Offer commercial model of Proctor needle

A standard commercial model of the Proctor penetration needle for measuring the rate of initial set in fresh concrete is available from E. W. Zimmerman Construction Chemicals, Inc.

Suitable for both laboratory and field use, the Acme penetrometer is

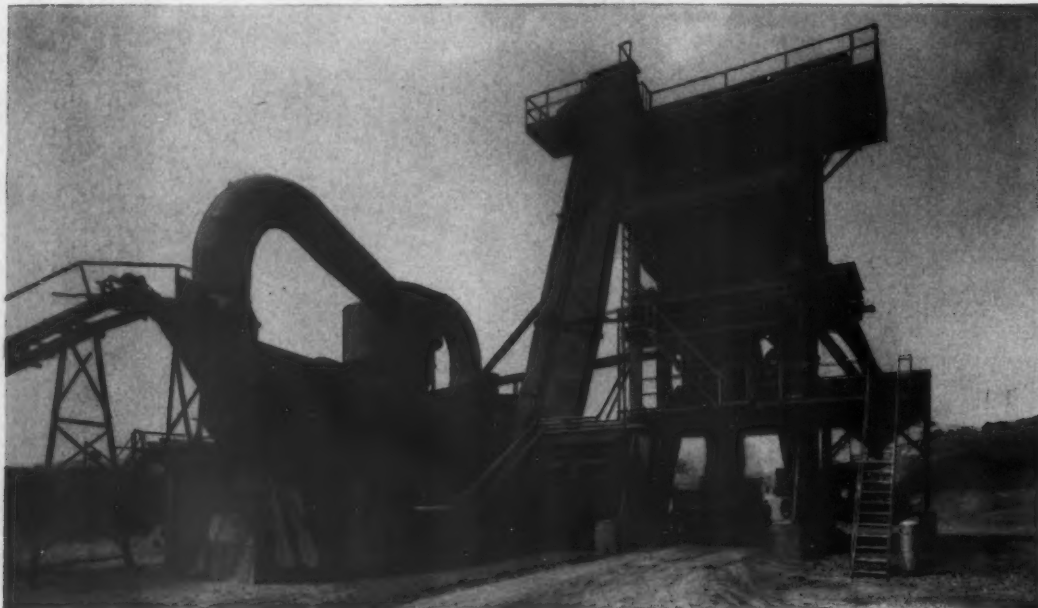


said to be particularly valuable to highway-department engineers and contractors for determining the rate of retardation of set induced by the use of retarding admixtures in concrete.

E. W. Zimmerman Construction Chemicals, Inc., Dept. C&E, 228 N. LaSalle St., Chicago 1, Ill. Circle No. 145 on Request Card.

CONTRACTORS AND ENGINEERS

THE USEFULNESS OF A LIMA MADSEN



5 tons of asphalt per batch to serve 3 lay-down machines

Lima Madsen has added the 10,000-lb. batch capacity stationary Model 581 plant to the top of its line of continuous-high-production asphalt plants. Rated output in excess of 300 tons hourly. Other models, portable and stationary, range in batch capacities from 1000 to 10,000 lb.

All Lima Madsens are clean operating—engineered and built for safety, long life and continual year-round operation. Designed for easy maintenance and accessibility—such as the exclusive externally replaceable sectional mixer liners. Fully automated

or remote controls are optional. Positive control by weight of every ingredient; rapid, thorough mixing. Patented pressure injection of liquid asphalt cuts mixing time 10 to 15%, reduces mix cycle to 45 or 50 seconds.

Unit design construction of factory-matched sections makes erection easy—whether portable or stationary models. Component equipment is available separately.

For detailed facts and figures, see your Lima Madsen distributor or write us for literature.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

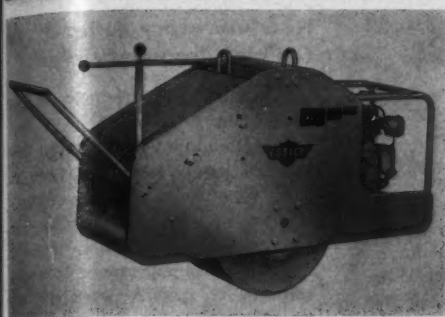
LIMA MADSEN Asphalt Paving Plants and Equipment

BALDWIN · LIMA · HAMILTON

CONSTRUCTION EQUIPMENT DIVISION · LIMA, OHIO

For more facts, use Request Card and circle No. 308





Offered for both soil and asphalt compaction, the Essick Model VR-13W is a self-propelled machine, requiring only the guidance of the operator.

New vibrating compactor for close-quarter work

The Model VR-13W vibrating compactor for compaction of either soil or asphalt is announced by the Essick Mfg. Co.

The new unit is ideal for compaction in close quarters, around foundations, trenches, ditches, and in almost inaccessible backfilling operations, states the manufacturer. Self-propelled, it requires only the guidance of the operator.

The Model VR-13W is 17½ inches wide, 71½ inches long (over all, including handle), 36 inches high, and weighs 700 pounds. Powered by a 4.8-hp air-cooled engine, and equipped with a separate clutch to allow operation with or without the vibrating mechanism engaged, the VR-13W propels itself at up to 1 mph, either forward or reverse.

Essick Mfg. Co., Dept. C&E, 1950 Santa Fe Ave., Los Angeles 21, Calif. Circle No. 105 on Request Card.

Hollow-core bits permit drilling bigger holes

With the addition of carbide-tipped, hollow-core bits just introduced by the Skil Corp., the company's Roto-Hammers can drill larger holes, up to 3½ inches in diameter, and reportedly can be used for drilling through the toughest masonry reinforced with steel rods or wire mesh.

Skil Corp., Dept. C&E, 5033 Elston Ave., Chicago 30, Ill. Circle No. 53 on Request Card.

Drafting tables feature moving straightedge

Three sizes are available in nuArc's new line of all-steel drafting tables with either horizontal or vertical moving straightedge.

The straightedge rides smoothly and accurately on a precision rack and gear mechanism. The top tilts from 0 to 45 degrees. The glass portion of the top is illuminated for easier and faster tracing.

Adjustable stops that engage the moving straightedge are a new feature provided on every table.

Sizes offered are 24 x 31-inch, 31 x 41-inch, and 43 x 52-inch.

nuArc Co., Inc., Dept. C&E, 4110 W. Grand Ave., Chicago 51, Ill. Circle No. 51 on Request Card.

Increased heat output with new salamander

The Scheu Products Co. announces a new oil-burning forced-air heater said to feature substantially improved combustion and heat output.

Easily portable, the unit stands 43½ inches high and weighs 33 pounds. It directs a strong flow of clean forced air outward and downward. The burning rate is adjustable from 70,000 to 125,000 Btu per hour.

Scheu Products Co., Dept. C&E, 297 Stowell St., Upland, Calif. Circle No. 146 on Request Card.



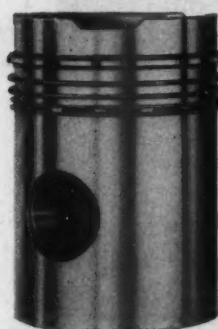
Special report to users of Caterpillar D7, D8 and D9 Tractors:



Parts you can trust
...cost less per hour

New Piston and Ring Combination Cuts Oil Consumption 33-50% ...Lasts Hundreds of Hours Longer!

4-RING DESIGN



NEW 3-RING DESIGN



What makes it so different? Look at the two Caterpillar-made pistons. Notice in the new design that *both* compression rings are now deeply seated in grooved cast iron (indicated in yellow) instead of only the top ring. Since cast iron is able to resist groove "pound out," both compression rings are held firmly *longer* in the correct position for maximum ring-to-liner sealing. Compression loss and blow-by *behind* rings and around grooves is delayed hundreds of hours, too.

The new intermediate compression ring is a "twist" ring, so-called because it changes position in the groove during the power stroke. It actually "twists" so its face has *greater sealing area* at the liner than regular rings—reducing the number of compression rings normally required. At the same time, it thins the film of oil left by the regular oil

control ring. This leaves less oil to burn away which contributes to the new piston's better oil control and longer ring life.

All rings now have a new look, too... *each and every face* is thickly chrome plated against wear. They are also "bright lapped" to such brilliance that any flaws can be easily seen and the faulty ring rejected. Such quality control assures almost perfect seating right from the start, eliminating break-in blow-by, slobbering and scuffing.

Cost? Pistons with the *extra* cast iron bands cost *slightly more*, but ring sets are less! Once you change over, your tractor maintains its power longer, your fuel and oil bills go down, and your next set of replacement rings will be less. Your Caterpillar Dealer has them in stock now.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

Diesel Engines • Tractors • Motor Graders • Earthmoving Equipment

For more facts, use Request Card and circle No. 309 →

NOVEMBER, 1961



Said to have increased flexibility for all types of digging operations, the new Napco backhoe digs up to 14 feet.

New backhoe features quick connect-disconnect

Napco Industries announces a new backhoe attachment designed for use with the firm's Crab tractor.

The main feature claimed for the backhoe is complete disconnection from the tractor by one man in less than one minute, without the use of special tools or other equipment. Installation of a loader counterweight in place of the backhoe is said to require only two minutes of one man's time.

The backhoe is capable of digging to a depth of 14 feet. Dumping height is 10 feet. Available bucket sizes range from 12 to 36 inches.

The backhoe can be powered with the same hydraulic system that is used for the front-mounted 1-yard loader.

Napco Industries, Inc., Dept. C&E, 834 N. 7th St., Minneapolis 11, Minn. Circle No. 11 on Request Card bound into this issue.



Here's
an
Idea!

GAR-BRO helped cut costs in pouring concrete piers!

One contractor cut the time in placing concrete on this bridge job by planning ahead. Here, on these two bridge piers, note that he used three complete units comprised of Gar-Bro Collection Hopper and a string of Steel Chutes plus a Gar-Bro Bucket. He used the hopper and chutes to direct the concrete into the forms and prevent segregation.

His object was to prevent any delays by using one hopper and chute unit to place concrete in one pier, while the second one was set in place in the other pier, and the third one (see it hanging in rack between piers) was being shortened. Delays of transit mixers and the crane were minimized by rotating the hopper and chute units and shortening the chute line to the new level of the concrete in each pier.

It's a good idea to team up your Gar-Bro Concrete Handling Equipment to save time and cut costs.

See your Gar-Bro dealer or write for Catalog and Concrete Handling Manual today!

Gar-Bro Mfg. Co. — Los Angeles, Calif.—Peoria, Ill.

General Offices: 2415 E. Washington Blvd., Los Angeles 21, Calif.



GAR-BRO

The World's Most Complete Line of
CONCRETE HANDLING
EQUIPMENT

For more facts, use Request Card and circle No. 310

New vibratory roller for high-frequency work

A variable-frequency roller is announced by Bros, Inc.

Known as Vibra-Pactor Model VP-2G, the unit offers from 1,500 to 4,000 vpm. It is especially recommended by the manufacturer for high-frequency compaction of sewer fills and bridge approaches. It is also valuable for shoulder work and bituminous repair.

The vibrating mechanism consists of four synchronized eccentric weights that are timed with hardened gears and fully enclosed in an oil-tight case. Powered with a 7-hp engine, the 3,200-pound vibrating

CM HOISTS

...choice of the
wise buyer
who compares



CM HOISTS AND PULLERS are ruggedly constructed to give you years of trouble-free service. Yet they are unusually light...easy to handle because they are constructed of the strongest alloys of steel and aluminum. Equipped with famous CM-Alloy flexible, welded alloy steel load chain.

CM CYCLONE

- Capacities from 1/2 to 10 ton.
- 1-ton model weighs only 36 pounds.
- 96% efficient—easy to operate.
- Lifetime lubricated.



CM PULLER

- Capacities 1/2, 1, 3 and 6 ton.
- 1/2-ton model weighs only 14 lbs.
- Compact: stores in tool box.
- Lifts or pulls at any angle.
- Lifetime lubricated.

Write for catalog and name of your nearest CM dealer.



CHISHOLM-MOORE HOIST DIVISION
Columbus McKinnon Corporation
FREMONT AVE., TONAWANDA, N.Y.
New York (Mountainside, N.J.)
Chicago • Cleveland • San Francisco
In Canada: Columbus McKinnon Limited, St. Catharines, Ontario
For more facts, circle No. 311

CONTRACTORS AND ENGINEERS

CONTRACTORS and ENGINEERS

MAGAZINE OF MODERN CONSTRUCTION

A BUTTENHEIM PUBLICATION

The first phase —

Contractors everywhere know that their part in the business of building — more dramatic as it often may seem — would be impossible without the preliminary and accompanying work of engineers. Any structure begins with design, and this may indeed be the most dramatic aspect of the project.

Aware of this fact, C&E's editors are on the lookout for unusual engineering articles. In last month's issue, for instance, Eastern Field Editor Don Taylor described the engineering studies and proposals for reclaiming the New Jersey Meadows — a vast swampland adjacent to New York City.

(over)

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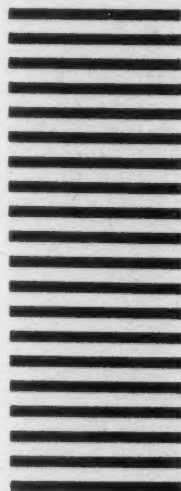
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470 Park Avenue South

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READER REQUEST CARD

NOVEMBER '61

For more information or catalogs on any product described in this issue
circle the correct identification number below:

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in Francisco
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111
ENGINEERS

CONTRACTORS and ENGINEERS

MAGAZINE OF MODERN CONSTRUCTION

A BUTTENHEIM PUBLICATION

The first phase (Cont.)—

This month, Editor Bill Quirk gives the reader a look at a unique super-market under construction in Poland. The roof-support design of this unusual structure represents a striking blend of art and science, and Bill illustrates his report with both photographs and engineer's drawings.

From Alaska, our 49th state, comes next month's engineering feature—a story with engineering drawings of the unusual design of a gravel-fill dam. Succeeding issues of C&E will carry other engineering articles written by our own field staff of engineer-editors.

READER REQUEST CARD

NOVEMBER '61

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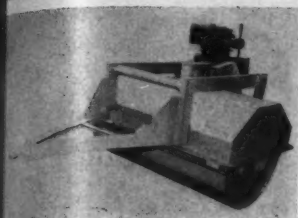
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CONTRACTORS and ENGINEERS

470 Park Avenue South

New York 16, New York

READER SERVICE



Easily towed by a small wheel-type tractor, the Vibra-Pactor VP-2G is designed for a variable operating frequency of from 1,500 to 4,000 vpm.

force delivers a maximum applied force of 4,950 pounds at 4,000 vpm.

When used as a static weight roller, it may be filled with 169 gallons of water to bring the total weight up to 3,116 pounds.

The Vibra-Pactor VP-2G can be easily towed by small wheel-type tractors. Over-all width is 68 1/4 inches, and length with tongue is 94 inches. The tongue can be adjusted to any height from 16 1/2 to 35 inches above ground.

Bros, Inc., Dept. C&E, 1057 10th Ave. S.E., Minneapolis 14, Minn. Circle No. 20 on Request Card.

New engineers' transit is high-precision unit

Eugene Dietzgen Co. announces the compact, high-precision, fully enclosed Top-Site No. 6140 engineers' transit.

This dustproof surveying instrument incorporates an antireflective, prismatic erecting system utilizing a 1-inch telescope.

The unit's focusing knob is side-mounted within easy reach, rather

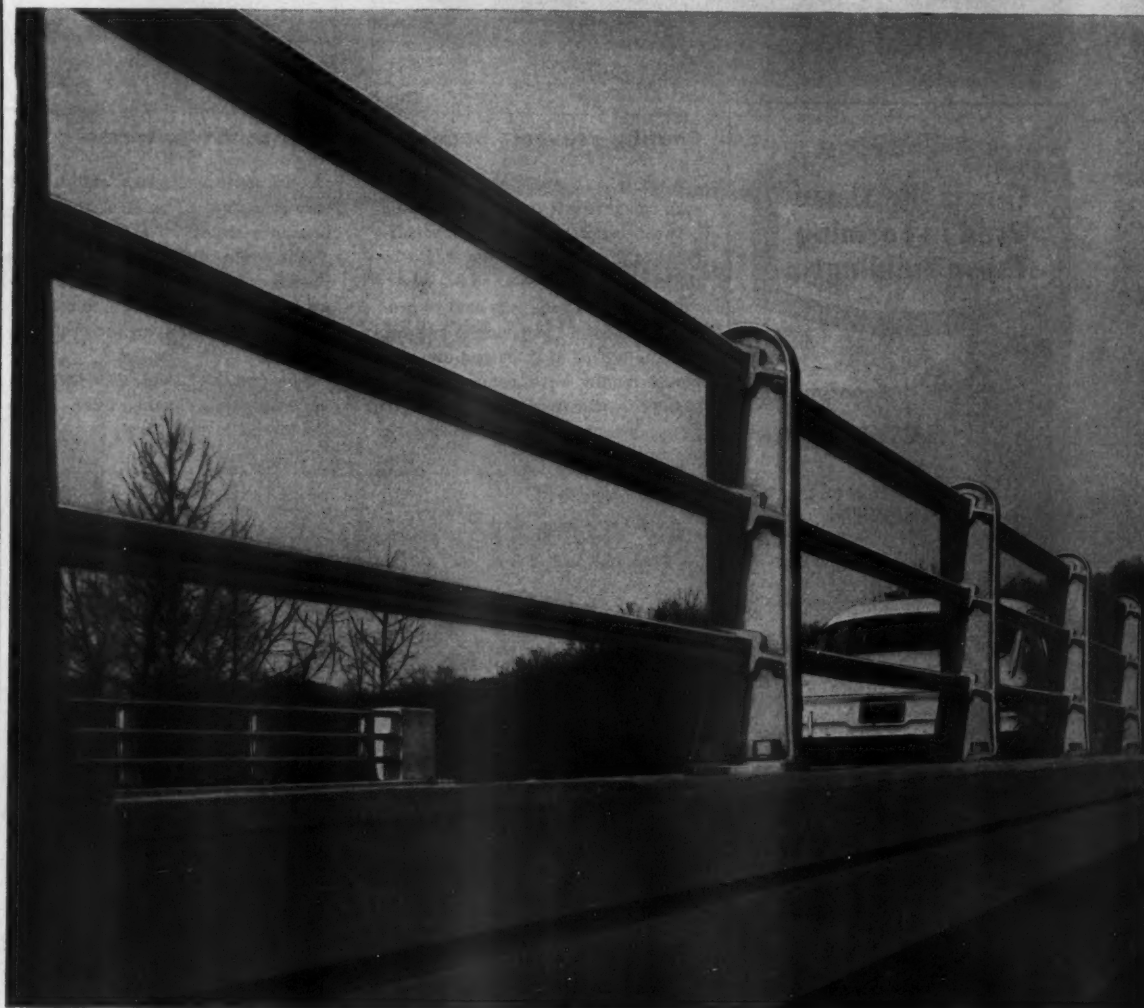


than on top of the telescope, and is calibrated to show approximate focusing distances. The telescope is also provided with a dioptic ring for individual focusing.

Other features include a built-in optical plummet that rotates with the instrument for accurate positioning, rough aiming sights, a sliding sunshade attached to the telescope ready for instant use, tubular compass built into the left standard, and a mirror arrangement for quick viewing. The instrument weighs less than 10 pounds.

Eugene Dietzgen Co., Dept. C&E, 2205 N. Sheffield Ave., Chicago 14, Ill. Circle No. 98 on Request Card.

When freezing temperatures threatened to shut down its 12.7-mile grading and draining job in Laurens County, South Carolina, the firm of Lee & Fox, a joint venture, assigned a Cat D8 tractor with No. 8 ripper to ripping the frozen material, thus opening up the cuts to their high-speed scrapers. Caterpillar Tractor Co., Dept. C&E, Peoria, Ill. Circle No. 149.



Galvanized for years of service

BETHLEHEM PERFECT VISION BRIDGE RAILING

When you install Bethlehem Perfect Vision Bridge Railing, you can count on years of service, free from unsightly corrosion. Galvanized to meet all ASTM specifications, Bethlehem Bridge Rail will, under normal conditions, last as long as the bridge itself. The posts are ASTM A-47 malleable iron castings.

Send for our free booklet on Perfect Vision Bridge Rail. It gives full specifications and describes test data in detail. Get in touch with the nearest Bethlehem sales office, or write directly to us at Bethlehem, Pa.

IT'S THE RAILING WITH EYE APPEAL

- Neat, trim appearance . . . unobstructed view.
- Sturdy protection—meets ASHO strength specifications.
- Easy installation . . . delivered ready to install . . . just a few nuts to tighten.
- Damaged rails easily replaced.
- Variable post spacing.
- Four styles available—one- and two-rail for parapets; three- and four-rail for curb and sidewalks.



for Strength
... Economy
... Versatility

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Sales: Bethlehem Steel Export Corporation

BETHLEHEM STEEL



For more facts, use Request Card and circle No. 312



Designed for off-highway work, this 1962 Dodge W-500 4-wheel-drive dump truck features a 157-inch wheelbase; 125-hp, 6-cylinder engine with 251-cubic-inch displacement; 4-speed transmission; and a maximum gvwr rating of 20,000 pounds. A 202-hp V-8 engine with 318-cubic-inch displacement and a 5-speed transmission are optional. A 7,500-pound front axle and a single-speed, 17,000-pound rear axle are standard. Dodge Division of Chrysler Corp., Dept. C&E, 21500 Mound Road, Warren, Mich. Circle No. 99 on Request Card.

This is the Shore Used in Forming These Buildings...

With Economical
ELLIS METHODS!

United States Senate
Office Building
Washington, D. C.

United States House
of Representatives
Washington, D. C.

Smithsonian Institute
Washington, D. C.

Olympic Stadium
Washington, D. C.

Kaiser Building
Oakland, Calif.

Miami Herald
Miami Beach, Fla.

Firestone Office &
Warehouse Building
Nashville, Tenn.

Southwestern Bell
Telephone Addition
Dallas, Texas

Chemistry Building
U. of Texas, Austin, Tex.

Public Health Building
Philadelphia, Pa.

Carnegie Institute
of Technology
Philadelphia, Pa.

Municipal Auditorium
Pittsburgh, Pa.

ELLIS SHORE—

"up and down" faster,
easily adjusted, safe,
and economical! Send
plans on your next job
for free suggestions.

Ellis
MFG. CO.
INCORPORATED
211 N. W. 4th St.
OKLAHOMA CITY, OKLA.

For more facts, circle No. 319

Coating prevents bonding between concrete, forms

A chemical compound that reacts with concrete mix to prevent bonding between concrete and the inner surfaces of forms or molds is offered by the Nox-Crete Co.

Called Nox-Crete, it is said to produce a smooth, flat concrete surface, essentially free of voids and one that bonds readily with concrete paints and cement coating. Moreover, the by-products of this chemical reaction

waterproof wood forms and act as rust preventatives on steel, the manufacturer states.

Nox-Crete form coating sprays readily even at below-freezing temperatures and forms can be used minutes or weeks after spraying, according to the firm.

Nox-Crete Co., Dept. C&E, 20th and Williams Sts., Omaha, Nebr. Circle No. 40 on Request Card.

AGRICAT! . . . Rugged, Compact

Earth Mover gives top performance
in tight spots — Slashes job Costs!



AGRICAT . . . The small Tractor with 1000 uses. Built to take a beating on the toughest Construction jobs!

THE NEW LONG TRACK AGRICAT gives consistent low cost performance.

Hydraulic Bucket makes loading FASTER — EASIER in tight places. Breaks, loosens, loads hard packed soil in areas too small for other equipment.

AGRIHOE digs backyard pools, shelters in minutes! It is an efficient trench or foundation digger . . . ideal in tight spot operations.

Selected territories now open . . .
phone, write or wire collect.

WESTERN TRANSMISSION CORPORATION

2150 Franklin Street, Oakland, California • Phone: TE 6-0890

For more facts use Request Card and circle No. 314



AGRICAT



LOADER



AGRIHOE

... for winter
ice control
SWENSON
SPREADERS
... for summer
resurfacing



New

... REPLACEABLE TAIL GATE MODEL



New

... V-BOX STYLE SPREADER



Industry
Standard

... FORCED FEED, ROLL TYPE

Here's year-round spreading dependability for any combination of sand, gravel, salt, chemical or cinders. Swenson's new Replaceable Tail-Gate and V-Box models give the driver precise, hydraulic cab control for direction, width and flow of material — spread wide or narrow — heavy or light — left, center or right with swaths from 2' to 45'. Reliable Forced Feed, Roll Type Spreader is the standard of the industry — spreads material evenly at all speeds. Write today for information about Swenson's complete spreader line.

SWENSON SPREADER
LINDENWOOD, ILLINOIS

For more facts, circle No. 315

CONTRACTORS AND ENGINEERS



The Schramm Series 62 Pneumatractor is shown with the Model 4M loader. One of the many attachments available for the new machine, the loader features longer and higher reach and increased clearances.

New compressor/tractor mounts many accessories

Schramm, Inc., announces the new Series 62 heavy Pneumatractor. This complete compressor/tractor package is basically a self-propelled 15-cfm air compressor capable of mounting a wide variety of accessories. The compressor permits selection of 42, 84, or 125-cfm capacity as required, making it possible to operate pneumatic tools at the same time an accessory is being used. Schramm, Inc., Dept. C&E, 900 E. Virginia Ave., West Chester, Pa. Circle No. 106 on Request Card.

Liquid compound prevents asphalt-pavement damage

To prevent winter damage to asphalt pavements, resulting from use of de-icing salts and ice-melting chemicals, Jennite J-16 is offered by Maintenance, Inc. The liquid is said to seal pavements and prevent water penetration. Maintenance, Inc., Dept. C&E, W. Liberty St. Ext., Wooster, Ohio. Circle No. 76 on Request Card.

Winslow

TRUCK SCALES PIT AND PITLESS TYPES

Capacities: 15, 18, 20, 30, 40, 50, 60 and 70 tons.

For use at temporary and permanent locations, stockpiles, and by bituminous material contractors at the jobsite.



TYPE CS — PITLESS — PORTABLE

Write or phone
Dept. B-70 today
Phone NORTH 1231

WINSLOW GOVERNMENT STANDARD SCALE WORKS, INC.
25TH & HAYTHORNE
TERRE HAUTE, IND.

For more facts use Request Card and circle No. 317

"Our 1½-yard MARION will outload a competitive 2-yard rig by over 650 yards a day!"



JOB FACTS Location — Fords, New Jersey. Material — fill dirt. Production (approx.) — Marion 362, 180 15-yard dumps per 8-hour day; Marion 43-M, 120 15-yard dumps per day; 2-yard competitive rig, 125 15-yard dumps per day.

"That means, simply and profitably, 45 more 15-yard trucks leave the pit every day," continued Charles Ludwig, owner of Liberty Excavating Company in Fords, New Jersey. "And, it takes less fuel than the competitive machine . . . at least 10 gallons less fuel every day. The fuel isn't necessarily expensive, but the delay to refuel the other machine is."

Superintendent Charles Ludwig, Jr. on costs: "We've had no major downtime since the Marion 362 was purchased back in September, 1959."

The Marionair control system helps too. With the controls on the two-yard unit requiring some ten minutes daily to adjust the linkage, the Marion can be loading five additional trucks."

Small wonder the field-proved 362 is one of the industry's great excavators. And, it keeps getting better. A dozen recent improvements including a new single-stick handle make this a shovel to compete with—not against. Interested? We've got more facts and figures for you that dramatically demonstrate why . . .

you get more with **MARION**

MARION POWER SHOVEL COMPANY • Marion, Ohio

A Division of Universal Marion Corporation



FOUNDATION CONSTRUCTION

CAISSONS

DRILLED AND UNDERREAMED PIERS

SPECIAL DRILLING PROBLEMS

Offices in Atlanta, Ga.,
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Write or phone for a quotation
on your next foundation job —
ANYWHERE IN THE WORLD

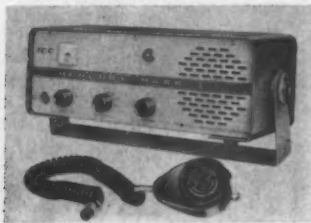
**McKINNEY
DRILLING COMPANY**

MACODOCHES, TEXAS

Ph. LOgan 4-8373 • P. O. Box 190

For more facts, circle No. 316

For more facts use Request Card and circle No. 318



Two-way radio-telephone offers eight channels

The Mercury Mark I citizens-band 5-watt transmitter-receiver is available from the International Communications Corp.

The receiver is an all-tube super-heterodyne with any combination up

to eight crystal-controlled spot frequencies for channels 1 to 22, as required. Output meter and controls are front-panel mounted with combined on/off and volume, adjustable squelch control, and 8-channel selector switch.

The compact 15-pound unit is powered externally by 115-volt 50/60-cycle ac supply and/or 12-volt dc battery.

International Communications Corp. Dept. C&E, 1929 Wilshire Blvd., Santa Monica, Calif. Circle No. 89 on Request Card.

The central spillway of Grand Coulee Dam is half as wide and twice as high as Niagara Falls—1,650 feet.



Featuring a controlled blow with an impact of up to 500,000 pounds, the Woodpecker is said to score and break pavement at the rate of 1,000 to 2,000 feet per hour, depending on conditions.



for strength, economy, durability

Despite winter weather, this Armco MULTI-PLATE Pipe culvert was quickly assembled by bolting together corrugated metal plates.



Armco Pipe Installed 9 days after order

It was an emergency—an old stone arch culvert failed under a road at Rocky River, Ohio. To reopen the road, the culvert had to be replaced quickly! So they ordered an Armco MULTI-PLATE® Pipe.

Just 9 days after placing the order for this 132-inch diameter, 84-foot long structure—it was assembled in place, ready for backfilling!

Armco will always make an effort to give the type of service you desire and your local Armco Sales Engineer will do everything he can to expedite delivery for your project. For dimensional information and delivery data, call him. Armco Drainage & Metal Products, Inc., subsidiary of Armco Steel Corporation, 7931 Curtis Street, Middletown, Ohio.



ARMCO Drainage & Metal Products

For more facts use Request Card and circle No. 319

Mobile pavement breaker travels up to 55 mph

A new mobile pavement breaker announced by the RPB Corp.

Designated Woodpecker, the unit is completely hydraulic, although it has no compressor or hose, and reaches the job under its own power at speeds up to 55 miles per hour. It requires a single operator.

Creeper speed is 14 feet per minute and the machine is said to be highly efficient in gutter and curb cutting. All controls are at fingertip reach.

RPB Corp., Dept. C&E, 2761 E. 11th St., Los Angeles 23, Calif. Circle No. 159 on Request Card.

New switch eliminates crane, hoist overload

A switch designed to automatically eliminate overloading of cranes and hoists is offered by W. C. Dillon & Co., Inc.

When attempts are made to lift loads beyond preset limits, the unit, called the Dyna-Switch, is said to im-

So Much Control . . . So Little Space

HUSCO HYDRAULIC VALVES

HUSCO 4-Plunger, 45 G.P.M. Series 3200-SP Valve



- In ONE to SIX Plunger Designs
- For up to FOUR Control Positions
- Capacities from 3 to 185 G.P.M.

Other HUSCO features include:

- Power-Saving Pilot-Operated Relief Valve
- Short Plunger Movement for more accurate control — at minimum effort
- Check Valve Controlled circuits — Conventional or Parallel
- Compact, precision-built for minimum space
- Over 120 Standard Models — for unlimited modification to your needs

Check HUSCO First for Hydraulic Control. Write for your copy of HUSCO'S "House of Ideas in Control Engineering" — or design assistance on your next.



HYDRAULIC UNIT SPECIALTIES CO.

PUMPS • VALVES • CYLINDERS

P. O. Box 257-E, Waukegan, Illinois

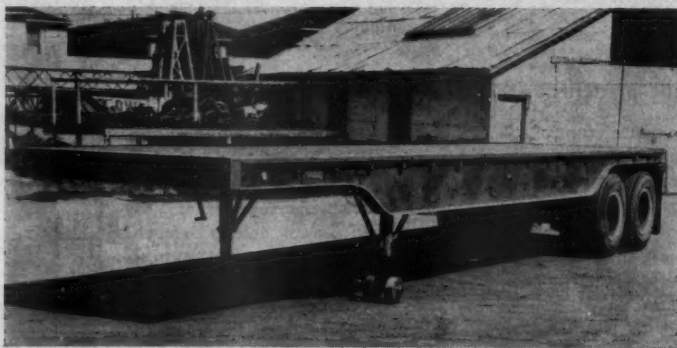
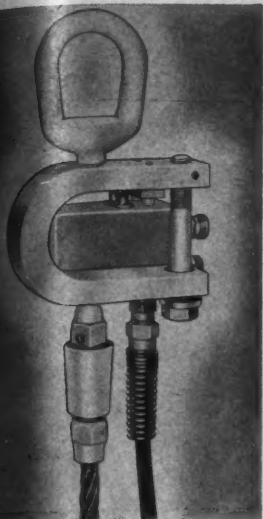
West Coast Representatives

EASTMAN PACIFIC CO., Los Angeles, Calif.

ROY BOBBS AIR-DRYALIC CO., Portland, Ore.

For more facts, circle No. 320

CONTRACTORS AND ENGINEERS



This platform trailer, one of the new Dorsey line, is available in 35 and 40-foot lengths, with 55,000-pound payload capacity rating (up to 25,000 pounds concentrated in any 10-foot area). The unit is designated Model PSTW-20. Dorsey Trailers, Inc., Dept. C&E, Elba, Ala. Circle No. 43 on Request Card.

Ellicott Dredge RECLAIMS SWAMPLAND

For Residential
Development



Operating company official states, "We are well pleased with the operation of the all-hydraulic control system. It is excellent. It has insured very economical ease of operation."

New residential area was created by filling swampland on the South Carolina coast adjacent to the Inter-coastal Waterway. The contractor, the Chatham Dredging Company, chose to handle the job with a 10" DRAGON® model portable, hydraulic dredge designed and manufactured by Ellicott. Influencing the contractor's choice were field-tested, advanced design features such as complete electro-hydraulic operation with centralized controls, a two-piece rectangular hull which can be assembled either ashore or in the water, and precision machinery easily accessible for servicing... eliminating costly delays for maintenance of vital operating parts.

Electro-hydraulic control of all moving parts gives greater handling ease and significantly reduces operator fatigue. Man size working and walk-around space between hull and machinery permits ventilation and easy safe inspection. The 40'x16'x4' "Chatham" digs to a maximum 20 ft. depth. It can pump fill materials through pipelines up to 2500 ft. long and has a total rated output of 325 cubic yards per hour. A 319HP diesel engine provides power.

Write for Bulletin 980 for complete design details and application potential of the DRAGONS. A DRAGON may be just what you need.

ELLICOTT DREDGES

ELLICOTT MACHINE CORPORATION, Baltimore 30, Maryland, U.S.A.; Ellicott-Brandt, Inc., Baltimore, Maryland; McConway & Torley Corp., Pittsburgh, Pennsylvania; Timberland-Ellicott, Limited, Woodstock, Ontario, Canada; Dragages Ellicott France, Paris, France; Dragas Ellicott do Brasil Ltda., Rio de Janeiro, Brazil; Ellicott de Mexico, Mexico City, Mexico. Successors to the floating dredge business of the Bucyrus-Erie Company and the American Steel Dredge Co. Complete engineering, design and construction service.



ELLICOTT MACHINE CORPORATION
1609 Bush Street • Baltimore 30, Maryland

Please send me your Bulletin 980 covering full details of the Ellicott DRAGON line of dredges.

Name _____
Company _____
Address _____
City _____ Zone _____ State _____

For more facts, use coupon or Request Card and circle No. 322

DON'T BUY ANY VIBRATORS

Yes, don't buy or rent any vibrators until you have thoroughly investigated the complete line of . . .

dart
Engineered Vibration

CONCRETE
VIBRATORS

For thorough investigation send today for name of your nearest distributor or, ask for our brochure describing our complete line . . . remember . . .

IF IT VIBRATES
DART MAKES IT!

dart MFG. & SALES CO.
1002 South Jason Street
Denver, Colorado

For more facts, circle No. 321

NOVEMBER, 1961

The Teale platform can be raised to a height of 25 feet and has a capacity of 1,000 pounds. Crane outriggers provide stabilization.

Offer catwalk attachment for truck-mounted crane

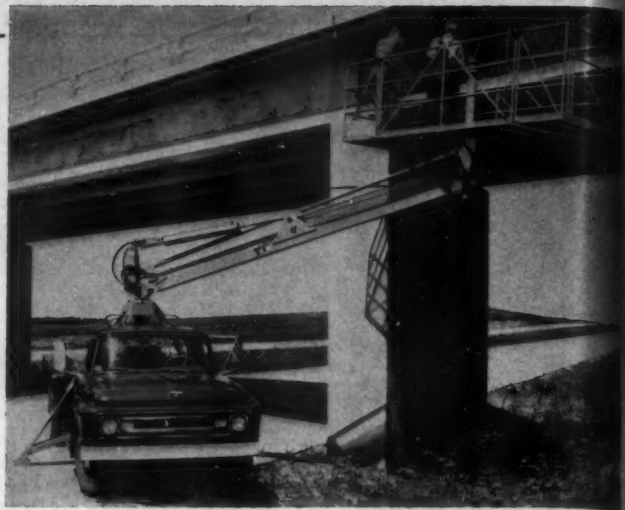
A versatile, highly controllable "catwalk" platform, designed as an attachment for the firm's Model 200 truck-mounted crane, is announced by Teale & Co.

The platform attaches directly on the 16-foot boom, providing workmen with a safe working area measuring 4 feet wide and 12 feet long. By swinging the hinged end-sections back, the 12-foot length can be quickly folded down to an 8-foot width.

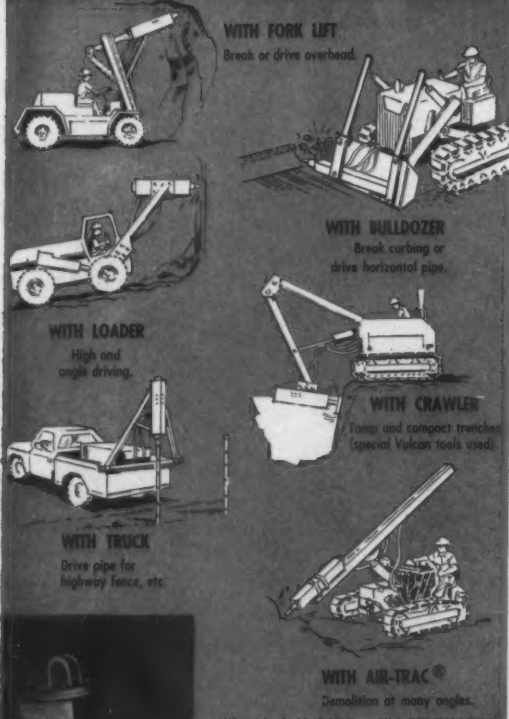
Controls are on the platform, which can be raised to a height of 25 feet.

The unit has a capacity of 1,000 pounds. It can be quickly removed to permit use of the Model 200 in its regular capacity as a crane. It can also be operated by means of the dual truckside controls from the ground.

Teale & Co., Dept. C&E, P. O. Box 605, Omaha 1, Nebr. Circle No. 12 on Request Card.



NOW . . . Drive, Break, Demolish, or Tamp at any angle . . .



VULCAN DGH-100A PORTABLE PILE HAMMER

With accessories for pile driving, pipe driving, concrete breaking, demolition, tamping. Differential acting. Striking parts 100 pounds. 303 blows per minute.

Write for Bulletin No. 30-B

Works at any angle, including upside down, and can be attached to any sturdy mobile carrier.

Since 1852



Vulcan Makes A Full Line of Pile Driving and Extracting Machinery. Bulletins on Request.

VULCAN IRON WORKS INC.
CHATTANOOGA, TENNESSEE

For more facts, circle No. 323

Chain assembly lifts pipes, structural beams

A special pipe-lifting chain assembly, designed to minimize the number of lifts required to lift and transport structural beams, pipe, or tubing, has been announced by the American Chain Division of the American Chain & Cable Co., Inc.

This assembly consists of an Ac-coly 125 double-leg sling chain with master link and pear-shaped end links to which are attached two triangular members; from these are suspended several dropper chains that can be equipped with sling hooks, sorting hooks, or hooks for particular needs. The assembly can be supplied with any number of dropper chains.

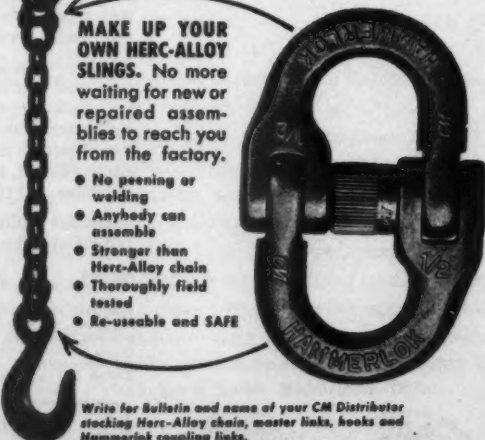
American Chain & Cable Co., Inc., American Chain Division, Dept. C&E, York, Pa. Circle No. 162 on Request Card.

A list of conventions of special interest to contractors and engineers appears on page 52.

Hammerlok® COUPLING LINK

MAKE UP YOUR OWN HERC-ALLOY SLINGS. No more waiting for new or repaired assemblies to reach you from the factory.

- No peening or welding
- Anybody can assemble
- Stronger than Herc-Alloy chain
- Thoroughly field tested
- Re-useable and SAFE



Write for Bulletin and name of your CM Distributor stocking Herc-Alloy chain, master links, hooks and Hammerlok coupling links.

RUGGED • DURABLE
CM
CHAIN

COLUMBUS MCKINNON
CHAIN DIVISION
COLUMBUS MCKINNON CORPORATION
TONAWANDA, NEW YORK
NEW YORK • CHICAGO • CLEVELAND
SAN FRANCISCO
In Canada: Columbus McKinnon Limited,
HERC-ALLOY® St. Catharines, Ontario

For more facts, circle No. 324

reliable
maintenance
is easy
with
experienced
STA-CRETE
epoxy resins

for industry, agricul-
ture, warehouses,
office buildings,
institutions, refineries,
plants, highways



Maintenance men specify STA-CRETE to solve hundreds of maintenance problems. Practically indestructible. STRONGER THAN CONCRETE. STA-CRETE epoxies are the solutions for repairing, resurfacing, patching, bonding, strengthening, waterproofing, and just plain wear and tear problems. Economical and easy to handle. Use only what you need; your supply will never deteriorate. Surface ready for heavy traffic overnight.

See your dealer or write:

STA-CRETE, INC.

115 New Montgomery St.
San Francisco 5, Calif.

For more facts, circle No. 326

MORE QUALITY ENGINE FEATURES IN STEPHENS-ADAMSON CARRIER



Series #200 Carriers

Series #700 Carrier

ADVANTAGES

- Spun-end roller assemblies interchangeable for quick construction.
- One-Piece, all-steel, construction.
- Positive lubrication system at factory . . . prevents lubrication.
- Roller brackets tilt in direction of travel for training effect.
- Die-cast labyrinth housing grease in . . . dust seal.



WRITE FOR BULLETIN
STANDARD PRODUCTS DIV.
STEPHENS-ADAMSON
97 RIDGEWAY AVENUE • ALBANY, N.Y.

For more facts, circle No. 325

CONTRACTORS AND ENGINEERS



Designed to work at any angle including upside down, the Vulcan Model DGH-100A portable pile hammer can be attached to any sturdy mobile carrier. It strikes 303 blows per minute, and the striking parts weigh 100 pounds. Vulcan Iron Works, Inc., Dept. C&E, Riverside Drive and Stewart St., Chattanooga, Tenn. Circle No. 112 on Request Card.



Prime-Mover Concrete Vibrator

Designed on the proven rolling-weight principle that:

1. Produces high frequency powerful vibrations
2. Permits the shaft to run cool and slow
3. Provides one hand portability
4. Changes from small to large heads quickly
5. Requires fewer parts — less maintenance
6. Gasoline or electric power units

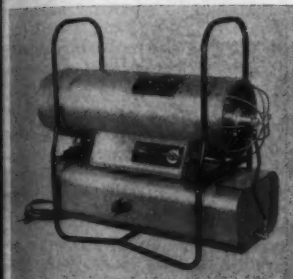
Guaranteed by Prime-Mover Co. — recognized for dependability in concrete handling equipment. Write to us for distributor's name and a demonstration. Prime-Mover Co., Muscatine, Iowa.

PRIME-MOVER

For more facts use Request Card and circle No. 327

Oil-fired space heater rated at 125,000 Btu

A new space heater is announced by the Thor Power Tool Co. According to the manufacturer, this portable, oil-fired unit can operate thirteen hours continuously at



low fire. The burner atomizes fuel centrifugally so there is no odor, smoke, or buildup of fumes.

Small in size and light in weight, this heater features an output of 70,000 to 125,000 Btu.

Thor Power Tool Co., Dept. C&E, 115 N. State St., Aurora 1, Ill. Circle No. 78 on Request Card.

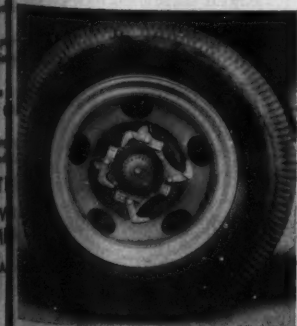
New mounting device for truck backup alarm

A new mounting device for its 6-inch bell back-up alarm has been introduced by the E. D. Bullard Co.

Designed for quick attachment, the unit facilitates installation and removal of the truck alarm.

If it is necessary to change a wheel, the alarm may be taken off by removing one pin.

E. D. Bullard Co., Dept. C&E, 2680 Bridgeway, Sausalito, Calif. Circle No. 81 on Request Card.



Some 20 miles away from the airfield, Celli's TECs are loaded in a jiffy — by hoppers or front-end loaders. Each makes 5 or 6 trips a day.

Aluminum HEIL-TEC Dump Trailers

Increase Payloads 5,000 lb.

for Celli Trucking Company



Celli Big User of HEIL Equipment

All told, Celli has 27 aluminum and 16 steel HY-TEC trailers; 6 Heil bulk cement transports; 4 Heil petroleum transports and 23 Heil dump bodies.



Two of Celli's 6 Heil bulk cement transports.



"High-flying" TEC trailers help maintain stockpiles of sand and gravel for expansion of airfield. Two of Celli's aluminum trailers dump sand here in double-quick time.

The live-wire Celli Trucking Company, Schiller Park, Illinois, has boosted payloads of sand and gravel with fleets of both aluminum and steel HEIL HY-TEC frameless dump trailers.

"Our aluminum HY-TEC trailers give us about 5,000 lb more payload than the steel units we had several years ago," says Gene Celli. He has ten 30-yd and seventeen 26-yd units.

He also hauls several-thousand-pound bigger loads in his steel TEC units than in his previous conventional steel dump units — has four 30-yd and twelve 26-yd steel HY-TECs.

Mr. Celli praised the fine stability of a TEC with its twin-draft arms — permitting operation on rough terrain and holding the body firmly during dumping cycle, even while jackknifed.

Low maintenance, more hauling time, bigger payloads — these HY-TEC advantages will make your hauling more profitable, too.

The HEIL-TEC distributor in your area will be glad to discuss your needs — every TEC unit is engineered for the kind of applications you specify and for the area where it will operate.

TEC
Division **THE HEIL CO.**

DUMP BODIES and HOISTS

TEC Division, 1285 West 70th Street, Cleveland 2, Ohio

For more facts use Request Card and circle No. 328

Free Product Literature...



describing the newest in
construction machinery and materials

To obtain copies, circle designated
number on the Request Card.

Trucks—Illustrated guide to truck selection for the construction industry. A special 22-page section is devoted to ready-mix concrete applications.

Ford Motor Co., Ford Division, Dept. C&E, Box 658, Dearborn, Mich. No. 102.

Heaters—Brochure covering Aeroil winter equipment including space heaters, salamanders, LPG and oil-

fired thawing torches, steam thawers, and portable water heaters. Also includes a detailed table on how to figure heater requirements for any given cubic-foot area. Bulletin WE-1.

Aeroil Products Co., Inc., Dept. C&E, 69 Wesley St., South Hackensack, N. J. No. 115.

Wheel excavator—Folder illustrating and describing Mechanical Excavators' Model 2000 wheel ex-

cavator for high-volume stripping or excavating of earth, sand, gravel, shale, sandstone, and other materials. Specifications, and a drawing showing the location of various components and over-all dimensions.

Mechanical Excavators, Inc., Dept. C&E, 2960 Marsh St., Los Angeles 39, Calif. No. 114.

Transit—Fact sheet on the Berger Astron 6 1/4-inch transit. Illustrated with photographs. Specifications.

C. L. Berger & Sons, Inc., Dept. C&E, 37 Williams St., Boston 19, Mass. No. 109.

Conveying, crushing, screening—Bulletins 1910 and 1910S (in Spanish), describing the complete line of Lippmann equipment. Facts include sizes, dimensions, output, etc.

Lippmann Engineering Works, Dept. C&E, 4603 W. Mitchell St., Milwaukee 14, Wis. No. 24.

Materials testing—Bulletin illustrating and describing the Forney line of testing machines and collateral apparatus for concrete, reinforcing bars, and aggregates.

Forney's Inc., Tester Division, Dept. C&E, P. O. Box 310, New Castle, Pa. No. 2.

Tractor shovel—Specification bulletin on the new, improved Trojan Model 404 tractor shovel. Lists standard and optional equipment. Form No. 4042.

The Yale & Towne Mfg., Co., Trojan Division, Dept. C&E, Main St., Batavia, N. Y. No. 25.

Electric vibrators—Bulletin on Syntrol electric vibrators. Complete data and specifications for the company's 14 standard "pulsating-magnet" models, as well as three pneumatic and hydraulic units, are presented. Bulletin No. 81461.

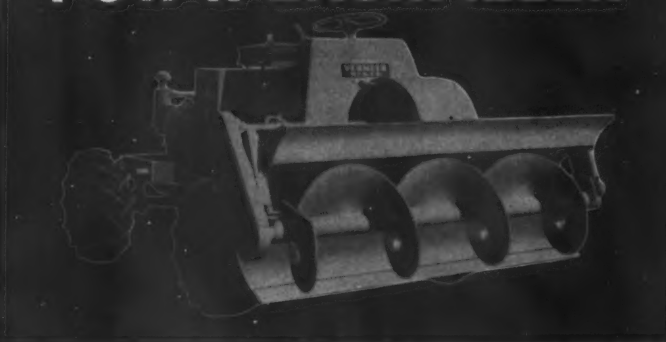
Syntrol Co., Dept. C&E, 227 Lexington Ave., Homer City, Pa. No. 59.

Dump bodies—Folder on the Hardee line of dump bodies, dump trailers, hoists, and allied equipment. Illustrated with photographs.

Hardee Mfg. Co., Dept. C&E, P. O. Box 629, Plant City, Fla. No. 110.

Sling chains—Catalog on Acme Kuplex sling chains. Charts show correct components to select for standard 2-leg, 3-leg, and 4-leg Kuplex slings. A separate chart shows working limits of sling chains when lifting.

NEW VERMEER POW-R-BACKFILLER

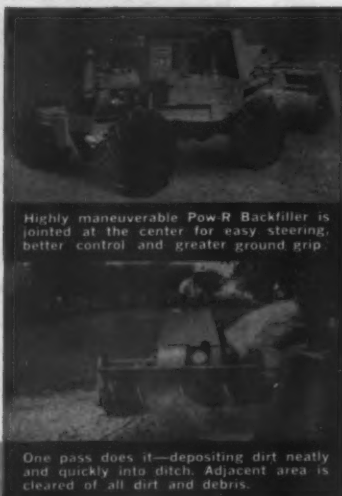


BIG, FAST, RUGGED MACHINE ENDS "BACKFILL PROBLEMS"!

Now, in one pass, you can deposit dirt back into a ditch at a lower cost and a higher speed than you ever thought possible... with Vermeer's new Pow-R-Backfiller. Here's a highly maneuverable 4-wheel drive unit with power steering that will backfill at speeds from 20 to 150 feet per minute, depending on backfilling conditions. Features a big 8' x 24" tilting auger that stays parallel with the ground while rotating. Assures a clean, smooth job under toughest conditions. The Vermeer Pow-R-Backfiller will not only cut your ditch filling labor and cleanup time, but also reduces your backfill equipment costs.

Just A Few Vermeer Backfiller Features...

- Powered by 36 HP Wisconsin Engine.
- Transport Speed—8 mph.
- Hydraulically operated 8' Auger tilts 5 degrees.
- Backfilling speed from 20' to 150' per minute.
- Hydraulically controlled power steering.
- Ideal for contractors, utilities, municipalities.



Highly maneuverable Pow-R Backfiller is joined at the center for easy steering, better control and greater ground grip.

One pass does it—depositing dirt neatly and quickly into ditch. Adjacent area is cleared of all dirt and debris.

MAIL COUPON FOR FULL
INFORMATION - LOW PRICES

Please send me complete information, literature and price of your new Vermeer Pow-R-Backfiller.

NAME _____
FIRM OR DEPT. _____ PHONE _____
ADDRESS _____
CITY _____ STATE _____



VERMEER MANUFACTURING CO.

1437 W. WASHINGTON • PELLA, IOWA

For more facts use coupon or Request Card and circle No. 329

* THE ORIGINAL SPRAY STARTING FLUID



• Starts diesel and gasoline engines (from the smallest to the largest) down to 65° F. below zero • Starts in seconds • Excellent in humid weather too • Millions of cans sold • See your automotive jobber

• The inventors of spray starting fluid. Patent No. 2,948,595

Ask for the can with the "balky donkey" trademark

SPRAY PRODUCTS CORPORATION

P.O. Box 1988 • Camden 1, N.J.

COMMENT from the BUTLER ENGINEER

... of Obsolete Ocean Liners as Central Mixed Plants

They're constructing caissons for a Chesapeake Bay job with a BUTLER Ready Mixed Plant. The Chesapeake project served up an unusual difficulty to furrow the contractor's brow. Waves. Waves that leap as much as 18 feet high. A barge-mounted plant was too risky. So the contractor bought an old, obsolete ocean-going boat. He mounted the BUTLER Plant amidships. Aggregate stock piles? In the hold. Works beautifully and the aggregate provides excellent ballast to modify pitch and roll. It's no idle wharf gossip that the Queen Mary will soon be supplanted, so when you've got yourself a big water job—buy her. Just mount a BUTLER Plant aft of the captain's bridge. Incidentally, the first class lounge would make wonderful offices. We're told that the men on the Chesapeake job never ask for shore-leave on weekends. Seems Chesapeake Bay is lousy with mermaids.

We recently mentioned a remarkable (remarkable, hell—astounding!) BUTLER Central Mixed Plant for pouring into the forms via agitator trucks, on paving jobs. The first location was a highway project near O'Hare field in northern Illinois. No pavers. No crews. Enormous savings. Eliminates traffic congestion at the grade. And it travels on its own wheels at 45 m.p.h., or if preferred it can be shipped "piggy back" on flat cars. Unloaded it travels on its own wheels to the job site. Takes about a day to erect. We have a Bulletin ready. Send for it.

Me? I love my job!

The Butler Engineer

BUTLER BIN COMPANY
WAUKESHA, WISCONSIN

For more facts, circle No. 331

CONTRACTORS AND ENGINEERS

For more facts, circle No. 330

Product Literature

made with the legs of the sling at 30, 45, and 60-degree angles. Catalog DE-10-B.
American Chain & Cable Co., Inc., American Chain Division, Dept. C&E, 14 E. Princess St., York, Pa. No. 151.

Ripper teeth—Brochure describing the new tips, teeth, and shanks on Caterpillar rippers, as well as roller, scraper, and loader cutting-edge improvements. Outstanding feature is the new weld-on adapter for the No. 9 and No. 8 rippers, allowing use of the new tips with all types of shanks. Form DE117.
Caterpillar Tractor Co., Dept. C&E, Peoria, Ill. No. 36.

Welding accessories—Catalog illustrating and describing Twoeco electrode holders, ground clamps, cable connectors, lugs, and splicers. Catalog No. 13.
Twoeco Products, Inc., Dept. C&E, P. O. Box 666, Wichita 1, Kans. No. 101.

Prestressing strand—Bulletin on Tuf-Lock strand for prestressed concrete. Pictures, charts, comparative graphs, data tables on physical properties.
Armed Steel Corp., Union Wire Rope Division, Dept. C&E, 2260 Manchester Ave., Kansas City 26, Mo. No. 72.

Dewatering—General catalog covering all aspects of dewatering in the construction business. Also contains information on Stang jet pumps and hydraulic equipment, with performance specifications and typical applications. Profusely illustrated.
John W. Stang Corp., Dept. C&E, 4221 Atlantic Ave., Bell, Calif. No. 75.

Cylinder casting—Literature outlining proper procedures in the casting of concrete cylinders. Covers selection of molds; correct sample taking; and filling, handling, and curing of cylinders. Bulletin RM-46.
The Master Builders Co., Division of American-Marietta Co., Dept. C&E, 680 Lee Blvd., Cleveland 18, Ohio. No. 152.

Earthmoving equipment—Booklet covering the complete line of Bucold equipment. Contains illustrations and condensed specifications on 2 models of crawler tractors, 8 scrapers, 9 rear-dump haulers, and 3 bottom-dump models. Form 327.
Bucold Division, General Motors, Dept. C&E, Hudson, Ohio. No. 113.

Tire valves, tools—Catalog covering the Schrader line of large-bore tire valves, tools, and air-service fittings for off-highway equipment. Also discusses air-liquid valves to facilitate liquid filling of tires for ballast purposes. Well illustrated. Catalog No. 380.
A. Schrader's Son, division of Sovill Mfg. Co., Inc., Dept. C&E, 470 Vanderbilt Ave., Brooklyn 38, N.Y. No. 28.

Bitumuls for hot-mix—Folder on Laykold asphaltic concrete and Bit-q-mix bitumuls for hot-mix pavements. Provides data on special features, adaptability, and recommended applications on both products. Bulletin A-32.
American Bitumuls & Asphalt Co., Dept. C&E, 320 Market St., San Francisco 20, Calif. No. 153.

Conversion kits—Folder describing conversion kits permitting owners of Series A and B Unit cranes and excavators to "oil-cool" the swing clutches on their machines.
Unit Crane & Shovel Corp., Dept. C&E, 6411 W. Burnham St., Milwaukee 19, Wis. No. 47.

Crushing plants—Catalog featuring Pioneer's Productioner portable complex crushing plants. Stresses the variety of screening arrangements available. Photographs and drawings illustrate text. Catalog No. 698.
Pioneer Engineering, division of Peer & Co., Inc., 3200 Como Ave. S.E., Minneapolis 14, Minn. No. 29.

Masonry drill—Bulletin on the Sprague & Henwood Model MDS-400 diamond masonry drilling machine for drilling holes from 1 to 6½ inches in diameter.

Sprague & Henwood, Inc., Dept. C&E, 221 W. Olive St., Scranton, Pa. No. 56.

Christmas gift plan—Brochure illustrating and describing the benefits of the Gift Bookard method of gift-giving. Contains gift-choice booklets in eight price ranges.

Automated Gift Plan, Inc., Dept. C&E, 80 Park Ave., New York 16, N.Y. No. 23.

Moisture-density determinations—Brochure detailing an improved TESTlab nuclear system for taking rapid field measurements of soil moisture content and soil density.
(Continued on next page)



PRIME-MOVER

POWER TO PRODUCE

Prime-Mover M-30A gives high production on the toughest jobs. More trips, less maintenance, smoother operation, with exclusive hydraulic torque converter drive. Hauls 2/3 yard or 1-1/2 ton. Bucket and flatbed interchangeable. Write for proof of production performance. Prime-Mover Co., Muscatine, Iowa.



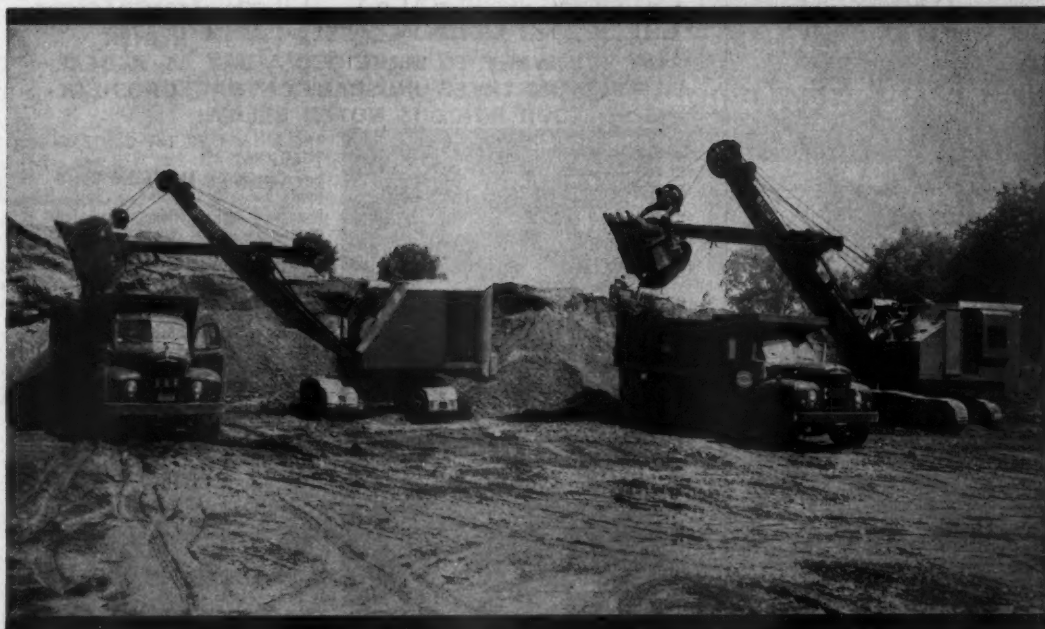
with
torque
converter
drive

For more facts use Request Card and circle No. 332

**"40,000
cu. yds.
loaded out
in record time"**

... say field reports about these two BAY CITY shovels. Owned by K & R Construction Co. of Camillus, N. Y., they are loading bank run gravel for use as sub-base material on the Empire Stateway Interstate Route at Syracuse. Fourteen trucks are needed to keep up with the two machine's output of 2300 to 2500 cubic yards per 8-hr. day.

You can't help admiring a BAY CITY'S digging ability. Smooth, balanced power is provided through a fluid coupling and speed reducing unit of helical cut gears running in oil. A one-piece continuous chain with automatic adjuster gives positive, powerful and independent crowd action. Power-operated retract is twice as fast as crowd ... provides positive control of dipper handle throughout the dig-swing-dump cycle. Mechanical power-controlled boosters set the main



drum clutches with minimum effort. Smooth acting swingers are engaged through needle bearings on hardened tapered keys — a combination that means quick response, fast swing.

BAY CITY crawler machines are offered as ¾- to 1½-yd. convertible excavators and as 20- to 30-ton erecting cranes. Truck-mounted CraneMobiles, with lifting capacities of 25- to 40-ton, are also available. Ask your local BAY CITY dealer to give you the complete story. Do it today!

BAY CITY

SHOVELS, INC.
2611-A CENTER AVE.
BAY CITY, MICHIGAN

a subsidiary of Unit Crane & Shovel Corp.

For more facts use Request Card and circle No. 333

Construction Camera

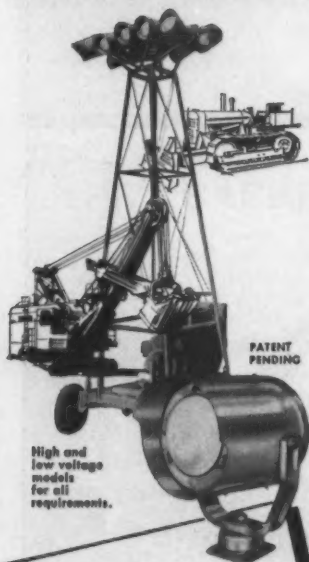


A 4-mile section of Milwaukee's National Ave. has been widened and resurfaced by the White Construction Co. The 2-inch binder course requiring 16,000 tons and the 1 1/4-inch top course requiring 10,000 tons of hot-mix were laid with a Barber-Greene. The Huber-Warco 8 to 12-ton tandem roller helped on the compaction.



Two trenches, 3,500 and 4,000 feet long, are being dug for pipes to extend water and sewer lines north from Silver Spring, Md. The \$56,000 job is being done by the Glenmar Construction Co., Inc., of Rockville, Md., using a 3/4-yard Unit 1020 trench hoe.

Super Rough Service STURDILITE Shock-proof Vibration-proof FLOODLIGHTS



High and low voltage models for all requirements.

From:
WESTERN CONTRACTING CO.
4 Months without a bulb failure. 22 STURDILITES burning for 4 months on a ruggedly used 60 ft. port. tower only 3 bulbs burned out in other fixtures previously used, bulbs burned out every 2 or 3 days.

From:
CLEVELAND CLIFFS IRON CO.
In a vibrating screening rig vibrating 700 RPM with 1/2" throw, bulbs in STURDILITES, burning round the clock, last as long as 50 days. In all other fixtures bulbs have to be replaced once a day. STURDILITES are now used regularly on earth moving equipment.

For better, more economical illumination of heavy construction, mining, quarrying and industrial operations, floodlight your equipment and areas with dependable, heavy duty STURDILITES.

Write for literature:
PHOENIX PRODUCTS COMPANY
4227 N. 27th Street • Milwaukee 9, Wis.

For more facts, circle No. 334

Product Literature

(Continued from preceding page)

Also discusses apparatus for accurately determining the volume of holes.

TESTlab Corp., Dept. C&E, 3398 N. Milwaukee Ave., Chicago 41, Ill. No. 21.

Hydraulic crane—Brochure on the Grove Model RT-57 12-ton hydraulic crane. Spex, photos, load charts, dimension prints.

Grove Mfg. Co., Dept. C&E, Shady Grove, Pa. No. 32.

Rotary drill—Manual on the Roto-Imp rotary-impact drilling tool. Illustrates and explains methods and techniques for drilling holes up to 6 inches in diameter in reinforced concrete.

Bill Jack Scientific Instrument Co., Roto-Imp Tool Division, Dept. C&E, Solana Beach, Calif. No. 154.

Emulsified asphalt—Bulletin on the benefits of Bitumuls emulsified asphalt for surface treatments and penetration pavements. Numerous on-the-job photographs illustrate text. Tabular data provided. Bulletin A-1.

American Bitumuls & Asphalt Co.,

ELECTRO-JET PORTABLE CONTRACTORS HEATER

DO YOU WANT TO MAKE \$50 A DAY AS A DEALER SELLING THESE UNUSUAL CONTRACTORS HEATERS? YOUR PRICE IS NOTED BELOW!

NEW! MODEL 709

Nationally Advertised
LIST PRICE
\$249.50



150,000 to 200,000 BTU

DELUXE MODEL 710

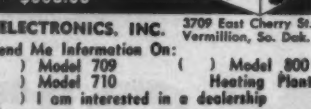
Nationally Advertised
LIST PRICE
\$298.00



200,000 to 300,000 BTU's

MODEL 800

Up to 250,000 BTU's
Nationally Advertised
LIST PRICE
\$398.00



Up to 250,000 BTU's
Nationally Advertised
LIST PRICE
\$398.00

DEALERS WANTED! MAKE UP TO \$500 PER WEEK IN YOUR OWN PROTECTED TERRITORY!

THE ANSWER TO THE CONTRACTOR'S PRAYERS!

Low Cost ★ Top Efficiency & Operation!

Keep your crews working in complete comfort in coldest weather.

MODEL 709 Your Dealer Price Only \$198.00 FOB Factory

★ Mobile ★ Versatile ★ Instant Heat
★ Cast Iron Construction — Won't Burn Out — 8 inch Steel Wheels

★ Standard Parts Available Anywhere
★ 709 and 710 Heaters Both Self Priming

MODEL 710 Your Dealer Price Only \$249.50 FOB Factory

★ Automatic Lighting — Just Flip the Switch for Instant Heat!

★ Portable — Complete with Rubber Tires

★ Stainless Steel Combustion Chamber with Cast Iron Baffling

★ Day Long Operation without Refueling!

★ Thermostatically Controlled — 20° to 90°

GET YEARS OF USE WITH ELECTRO-JET.

MODEL 800 Your Dealer Price Only \$298.00 FOB Factory

Up to 250,000 BTU's At NO EXTRA COST

● Oil or Gas Fired Heating Plant

● Can Be Installed for Permanent or Temporary Use

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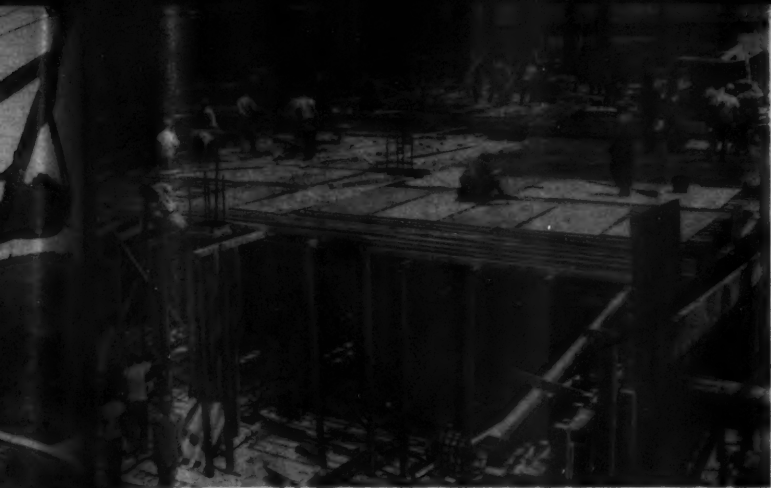


NEENAH FOUNDRY COMPANY
NEENAH • WISCONSIN

Chicago office: 5445 N. Navy Ave. Chicago 17, Ill.

For more facts, circle No. 336

CONTRACTORS AND ENGINEERS



Crews prepare for a record-breaking concrete placement of 16,000 square feet in a single day for New York City's 50-story Americana Hotel. The structural frame was designed by Farkas & Barron, the placement was carried out by the Dic Concrete Corp., and the builder is Diesel Construction Co., Inc., all of New York City.



On a 7-mile section of State Route 65 being rebuilt south of Rogers City, Mich., the I. L. Whitehead Co., Sault Ste. Marie, uses three LeTourneau-Westinghouse Model C Tournapull scrapers for grading. The middle scraper is being loaded by a Cat D8. The rigs are also used for work on drainage structures and seal-coating.

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to SPEED-LOAD ANY RIGS
just pick the model that does it best

You get Tilt-Top loading speed for any type of rig from shovels or backhoes, to farm-type tractors when you select from a dozen models developed by MILLER, the pioneer Tilt-Top manufacturer. For wide tread rigs — wide platform models offer a full 8 feet over the wheels — with rugged support right out to the edges. For extra low climb angle and even lower overall load height — between-the-wheel platform models. . . . Whatever the rig, there's a Tilt-Top to load it faster, easier . . . run thousands of trouble-free miles!

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capacities from 4 to 22 tons



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Milwaukee 14, Wisconsin

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Dept. C&E, 320 Market St., San Francisco 20, Calif. No. 89.

Helicopters—Brochure describing the newest Hiller light-utility-model helicopters. Discusses the use of the 3 and 4-place Hiller helicopters in a wide variety of work. Specifications and comparative performance charts included.

Hiller Aircraft Corp., Dept. C&E, 1350 Willow Road, Palo Alto, Calif. No. 155.

Alarm system for cranes—Leaflet on the Sigalarm, an electronic signal alarm system for crane booms, designed to automatically warn operators and ground crews of approaching contact with "hot" overhead power lines.

Crane Products Mfg. Co., Dept. C&E, 3549 S. Industrial Road, Las Vegas, Nev. No. 156.

Cold-weather curing—Brochure describing Cell-U-Form and Cell-U-Mat insulation for curing concrete, and illustrating their uses in winter.

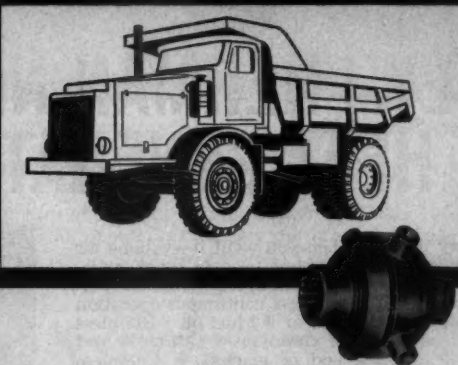
Wood Conversion Co., Dept. C&E, First National Bank Bldg., St. Paul 1, Minn. No. 157.

Spreader—Literature on the WK Model HY-LHD hydraulically driven spreader. Lists such features as quick attachment and one-man operation. Illustrations and specifications.

W-K Mfg. Co., Inc., Dept. C&E, 454 Ohio Bldg., Sidney, Ohio. No. 158.



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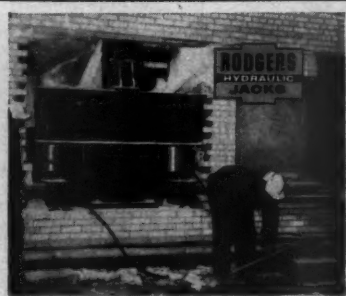


Models unfolding heights from 13 to 40 ft., 7½ hp. gasoline engine, centrifugal type reversing downstroke (1000 lb. capacity), side-loading platform 34 x 60 in. Also supplied with 1½ H.P. Electric Motor for 500 lb. capacity with mechanical brake.

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J-104D

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No. 336
D ENGINEERS

NOVEMBER, 1961

Plant-mix seal for a new pavement

Half-inch of open graded hot-mix material applied to roadway by bituminous paver

A plant-mix seal coat—rather than the usual asphalt and chips—was one of the finishing operations in reconstruction of U. S. 60 through Sunnymead, Calif.

The E. L. Yeager Co., Riverside, had the \$175,000 contract with the Highway Department—County of Riverside for the 8,200-foot section. Gas-tax funds allotted to the county were used for the job, and the California Division of Highways had certain legal obligations in indirect supervision. On the project for the contractor was Lew Boyer, paving foreman; Rod Boren served as resident engineer for the county of Riverside.

The work included the construction of curbs and gutters, a 4-inch cement-treated base, 3 inches of asphaltic-concrete paving in two courses, and the seal. The finished street is 6 feet between curbs, with the seal coat applied to the middle 48 feet. Operations started with a fog coat. . . .

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HN 850 125,000 BTU
HN 2250 300,000 BTU



Unique swirl combustor—maximum fuel economy.



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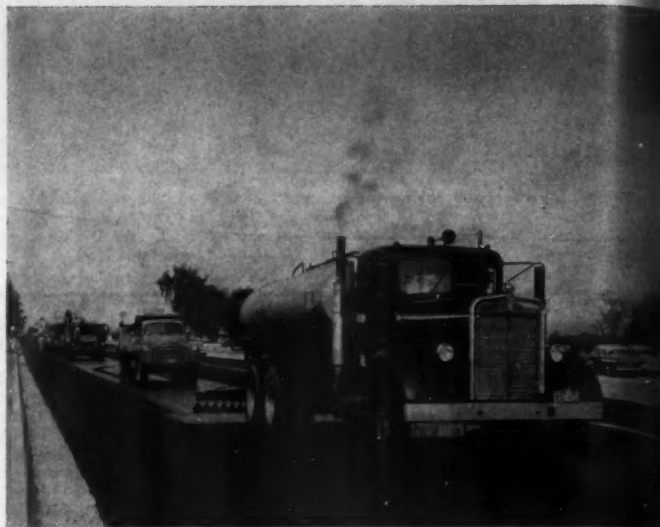


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COMPANY _____
ADDRESS _____
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After the finished pavement has been cleaned with a power broom, this big distributor on a Kenworth truck lays down a fog coat of RS-1 emulsified asphalt just ahead of the laydown machine.



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"Advanced Design" describes the kind of engineering thinking that goes into the creation of Airplaco pneumatic placing equipment. This advance-designing comes from years of research, testing and specialization in the field of pneumatic placement. Its result is equipment that will speed your jobs, lower your costs and allow you to make a profit.

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CONTRACTORS AND ENGINEERS



A Barber-Greene finisher lays down a 1/2-inch mat of the open-graded material from the Challenge-Cook Bros. truck. The mix consists of aggregate graded from 3/4 inch to No. 8 with 5 1/2 per cent of 85 to 100-penetration asphalt.



A Gallion 8-ton tandem roller compacts the mix right behind the laydown machine. On this last pass adjacent to the shoulder, the mix is feathered down to the minimum thickness the aggregate will permit.



MORE POWER: For greater range, full saturation coverage. **PRICE:** Lower than the price of lower-powered equipment. No other system has as much power, more features, or more sensible optionals. **NOTE:** If you have mobile FM radio in the 10-30-watt category, the 100-watt amplifier alone will boost your power to full 100-watts. For free descriptive literature, write today: Aeronautical Electronics, Inc., P.O. Box 6527, Raleigh, North Carolina.

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6. UNICALL* (to guard against unwanted signals on same frequency)

OPTIONAL

*Complete VHF system including antenna and/or external speaker. Also available in low-band, 50-150 frequency range. \$750. Please specify type and of the station.

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The seal-coat mix is produced in Yeager's plant in Riverside. This Madsen 4,000-pound plant has been modified with a Standard dryer and mixer and Symons screens. Its shop-built exhaust scrubber meets the smog-control standards.

"I WOULD NEVER CHANGE MY EIMCO WITH ANY OTHER MACHINE"



"If I need to buy another tractor, no doubt it will be an Eimco"
says Owner Cassinis of Impresa Cassinis, Italy.

The contracting firm of Impresa Cassinis bought an Eimco 105 Bulldozer in early 1958. It was immediately put to work in constructing the mountain super highway between Ceva and Savona and has worked steadily in the tough job of opening new roads in rock since that date.

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"Furthermore, the downtime and the maintenance cost of the machine have been definitely lower than any other type of machine; the Eimco 105 will be of the greatest help to me in reducing costs per yard on the new job I have recently contracted, on the Turin-Milan super highway

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* Names upon request.

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"Advanced Engineering and Quality Craftsmanship Since 1884"

B-776

For more facts use Request Card and circle No. 344

Product literature in November advertisements

The following free catalogs, bulletins, and other specific literature are offered by manufacturers advertising in this issue and whose advertisements were in our hands by October 15. To obtain any item, circle the designated number on the Request Card.

Pipe, couplings—Bulletin No. 59 on the combination of Naylor Spiral-weld pipe and Wedglock couplings for air, water, dredging, or ventilating lines. Circle No. 121 on Request Card.

Diamond bits—Bulletin No. 10 discussing the Acker line of diamond bits. Circle No. 119 on Request Card.

Differentials—Descriptive literature 862A on NoSpin differentials for heavy equipment. Detroit Automotive Products Corp. Circle No. 122 on Request Card.

Masonry bits—"Masonry Bit Selector Guide" featuring Cyclo-twist rotary carbide-tipped masonry bits. New England Carbide Tool Co., Inc. Circle No. 120 on Request Card.

Engines—Bulletin S-283 on Wisconsin engines offering from 3 to 60 horsepower. Circle No. 116 on Request Card.

Rammers—General Catalog No. 621 on Barco rammers for soil compaction. Circle No. 118 on Request Card.

Conveyor rollers—Bulletin 760 describing Stephens-Adamson conveyor rollers for a variety of carriers. Circle No. 117 on Request Card.

Pumps, jacks—Bulletin 242-B on the Farrel Watson-Stillman line of hydraulic pumps and jacks. Circle No. 134 on Request Card.

Grader—Bulletin No. 421 discussing the Gallion Model 160 grader. Circle No. 147 on Request Card.

Portable pile hammer—Bulletin No. 30-B on the Vulcan Model DGH-100A portable pile hammer with accessories for a variety of work. Circle No. 123 on Request Card.

Castings—Catalog containing 2000 patterns for Neenah Foundry and ductile iron castings. Circle No. 133 on Request Card.

Form panels—Catalog showing Efcoc flexible and regular form panels. Economy Forms Corp. Circle No. 135 on Request Card.



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EASIER...CLEANER...**

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Rotary Carbide-Tipped
MASONRY BITS

No more old-fashioned, time-consuming steel star bit drilling. Simply insert a Cyclo-twist Masonry Bit in any electric rotary drill and you've found the one best way to drill soft or medium hard masonry. Cyclo-twist is the only masonry bit.

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TRENCHER ON RUBBER
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Management

Process charts, equipment layout

by GEORGE E. DEATHERAGE, P. E.
construction consultant

Today, with competition increasing and the profit margin narrowing, contractors must take every possible advantage of planning methods to gain higher output. The process flow sheet is a means to that end; with it, the best or cheapest method can be figured on paper before the work is

started in the field and expenses have begun to accumulate.

Simple process charts and gang charts are useful in deciding on the best method to use in performing a specific piece of work, but they do not lend themselves to use in plant or equipment layout.

It is better to use work-simplification methods and the usual symbols in the form of a flow sheet in which a clear picture of all the operations (work done), transportations of men or materials, handling in temporary storage, and product inspections can be quickly seen. The object is to arrive at an equipment layout where these steps are at a minimum.

Since this work-simplification process is not in general use on construction, a job foreman will usually make a snap judgment of such a layout, based on his past experience and ability to reduce the work to a minimum. As the work gets under way, he may or may not wish to revise the setup.

Several charts with alternate layouts may be necessary before you get

the one with the fewest number of moves and with distances reduced to a minimum. The more repetitive work is, the more important and valuable the charting becomes. The volume of the work is also a factor.

How to use the flow chart

For an example, let us assume that we are setting up to make beam and girder forms for a multistory building or a bridge job where there is a great deal of duplication. In this case we have both beam sides and bottoms to prefabricate. This requires different jigs at the assembly benches. Here we can have one assembly conveyor line and make sides for a shift, then switch over to bottoms; or we can set up so as to make both simultaneously. Which method is best to use for production?

In drawing up the process flow chart, each piece of the raw stock must be reviewed as to the number of cuts to be made, and the pieces placed so as to give an uninterrupted smooth flow to the assembly jigs. The various pieces required must come off the saws in the right number and sequence to make one complete assembly. If the cut-to-dimension stock is small enough, it may be palletized and come down the conveyor line to the assembly jigs, or all except the larger and longer pieces may be palletized. The very small pieces may be tote-boxed and stored adjacent to the jigs. The aim is to have the right materials, in the right number, hit the assembly jigs at the right time.

An alternate method would be to make up cutting lists for all stock work to dimension, and stock ahead of time within reach of the jigs. This is a very common practice.

The point is that any or all of these alternate layouts can be set down on paper, factored out, and the best one selected. When this is done, a regular gang chart can be prepared showing the men and machines required at their hourly rates. Production steps by step can then be estimated and the cost of an assembly can be arrived at.

Industry introduces technique

This is exactly the technique now being introduced in the home-building industry in an attempt to stop rising costs. It is being introduced by the Research Council of the National Association of Home Builders in co-operation with The Stanley Works Co. of New Britain, Conn., and Robert Schmitt, a Cleveland house builder chosen for this project, and is to be known as TAMAP—Time and Methods Analysis Program.

TAMAP aims to find the best way to do a job. With this program, the best man and the worst man can get the job done with about the same efficiency. When you know the best method, the amount of effort required drops.

Probably more important than anything else is that this very simple procedure can be used by any foreman or supervisor with an elementary-school education.



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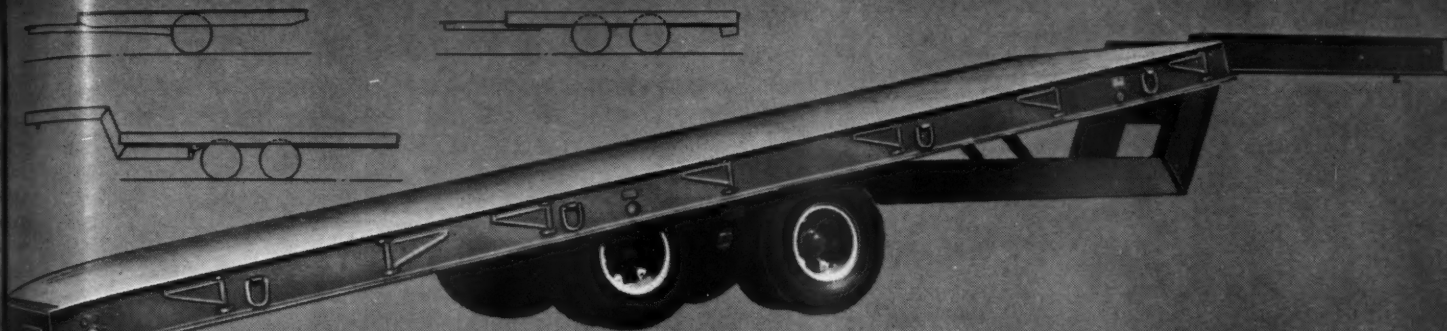
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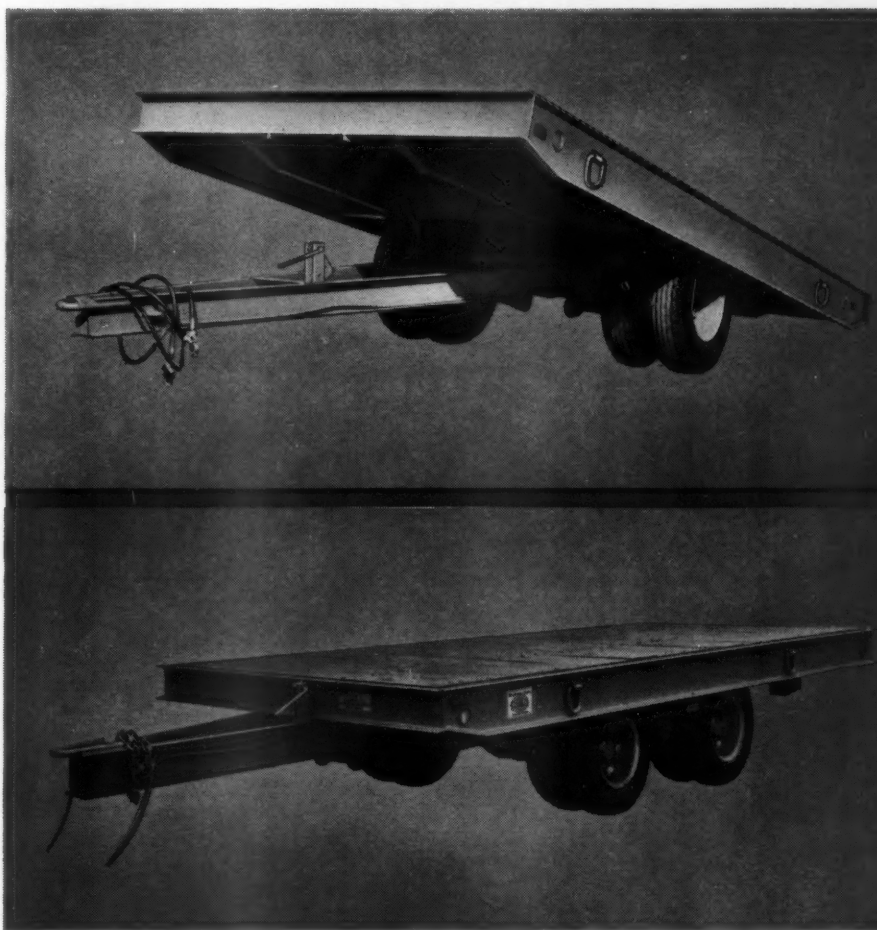
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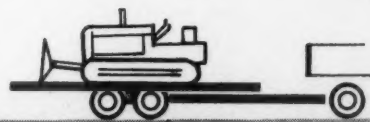
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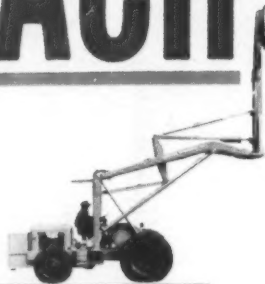
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